# The PHOTOFACT Servicer

SET 439 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★APR 15, 1959

## CONTENTS PHOTOFACT SET 439


| TRADE NAME AND MODEL | SET AND FOLDER NO. |
|---|---|
| **TELEVISION RECEIVERS** | |
| PHILCO | |
| Models G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M. W (Ch. 9L37, U) | 439-1 |
| TRAV-LER | |
| Models 1465, 1466 (Ch. 945-18) | 439-2 |
| WESTINGHOUSE | |
| H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, -2) | 439-3 |
| **OTHER EQUIPMENT** | |
| AIRLINE | |
| JWR-867A, -886A, -904A, -909A, -918A | 439-4 |
| DAVID BOGEN | |
| T661 | 439-5 |
| GRANCO | |
| 611 | 439-6 |
| LAFAYETTE | |
| LT-40 | 439-7 |
| MURASONDE | |
| 8125, L8200, L8400, SA8200, SA8400, ST8200, ST8400 | 439-8 |
| NEWCOMB | |
| 3D12 | 439-9 |
| PENTRON | |
| CS-20, PS-10 | 439-10 |
| PHONOLA | |
| 858 | 439-11 |
| PRECISION | |
| 10PA | 439-12 |
| RCA VICTOR | |
| AK1, SHP12, SHP13 (Ch. RS-172) | 439-13 |
| SILVERTONE | |
| 9222 (Ch. 528.53400) | 439-14 |
| SYLVANIA | |
| 1107, 2108 (Ch. 1-629-1, -2) | 439-15 |
| TRIXETTE | |
| A611, A680, A690, A720 | 439-16 |
| V-M | |
| 1281, 1282 | 439-17 |
| WESTINGHOUSE Record Changer | |
| RP190F | 439-18 |


This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

## IN THIS ISSUE OF THE SERVICER:

V-M
1000
Tuner
Control Panel
Main Amplifier

COUPLATE (VM 12569) (LEFT & RIGHT IDENTICAL)

R1 - 47K ±20%
R2 - 47K ±20%
C1 - 5000MMFD ±30%
C2 - 5000MMFD ±30%

COUPLATE (VM 12570) (LEFT & RIGHT IDENTICAL)

R3 - 100K ±20%
R4 - 220K ±20%
R5 - 10K ±20%
C3 - 220MMFD ±20%
C4 - 1000MMFD ±20%
C5 - .01MFD ±30%
C6 - 1000MMFD ±20%

RESISTORS

R6 - 500K ±30% POT. (VM 12352)
R7 - 1MEG ±30% POT. (VM 12353)
R8 - 1MEG ±30% POT. (VM 12353)
(LEFT & RIGHT IDENTICAL)
R9 - 82K 1/2W ±10% (VM 11193-10)
R10 - 1MEG 1/2W ±10% (VM 11453-10)
R11 - 220K 1/2W ±10% (VM 11293-10)
R12 - 56K 1/2W ±10% (VM 11153-10)

CAPACITORS

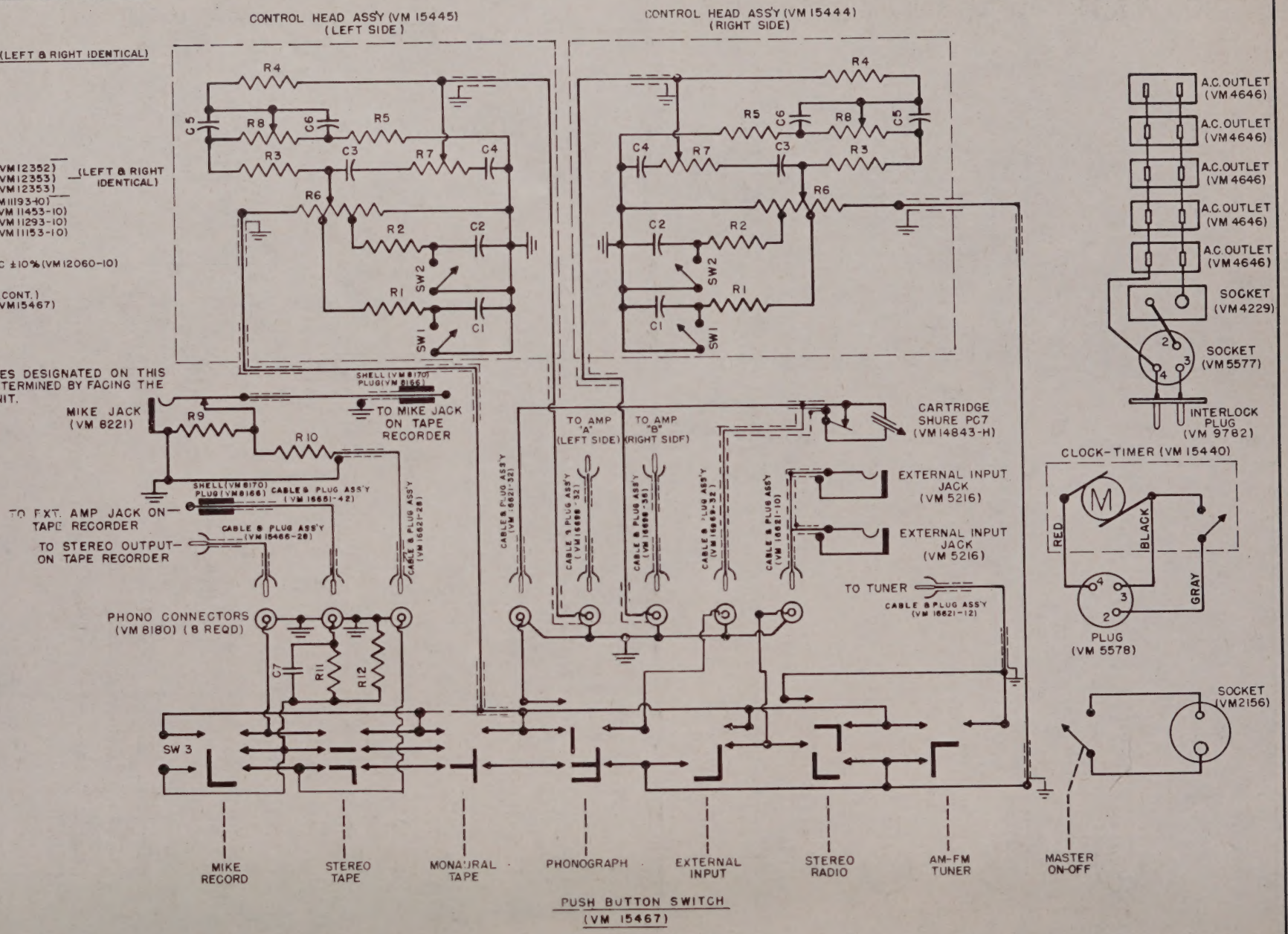
C7 - 200MMFD 600VDC ±10% (VM 12060-10)

SWITCHES

SW 1 & 2 - D.P.S.T. (VOL. CONT.)
SW 3 - PUSH BUTTON (VM 15467)

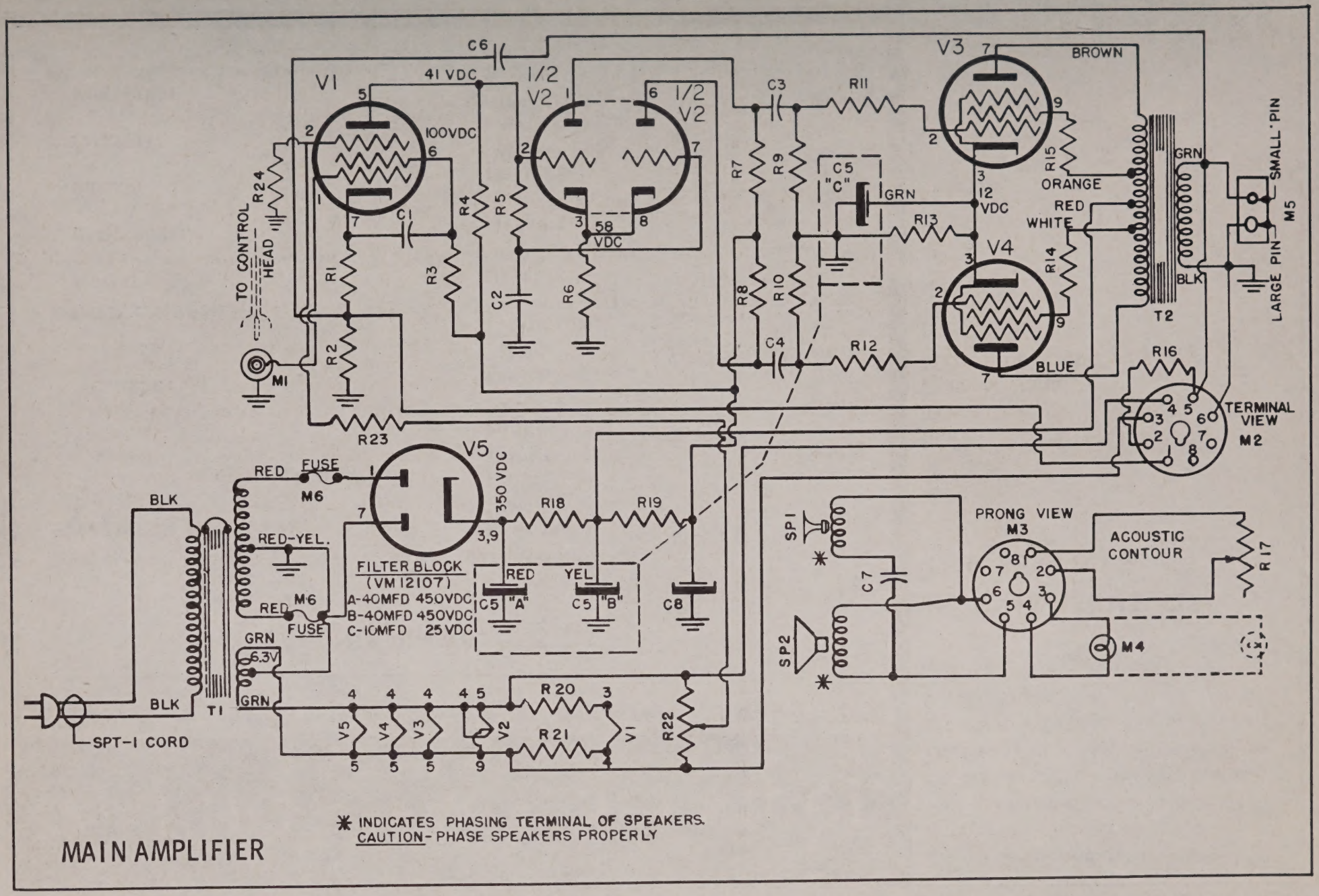
NOTE:-

RIGHT & LEFT SIDES DESIGNATED ON THIS SCHEMATIC ARE DETERMINED BY FACING THE FRONT OF THIS UNIT.



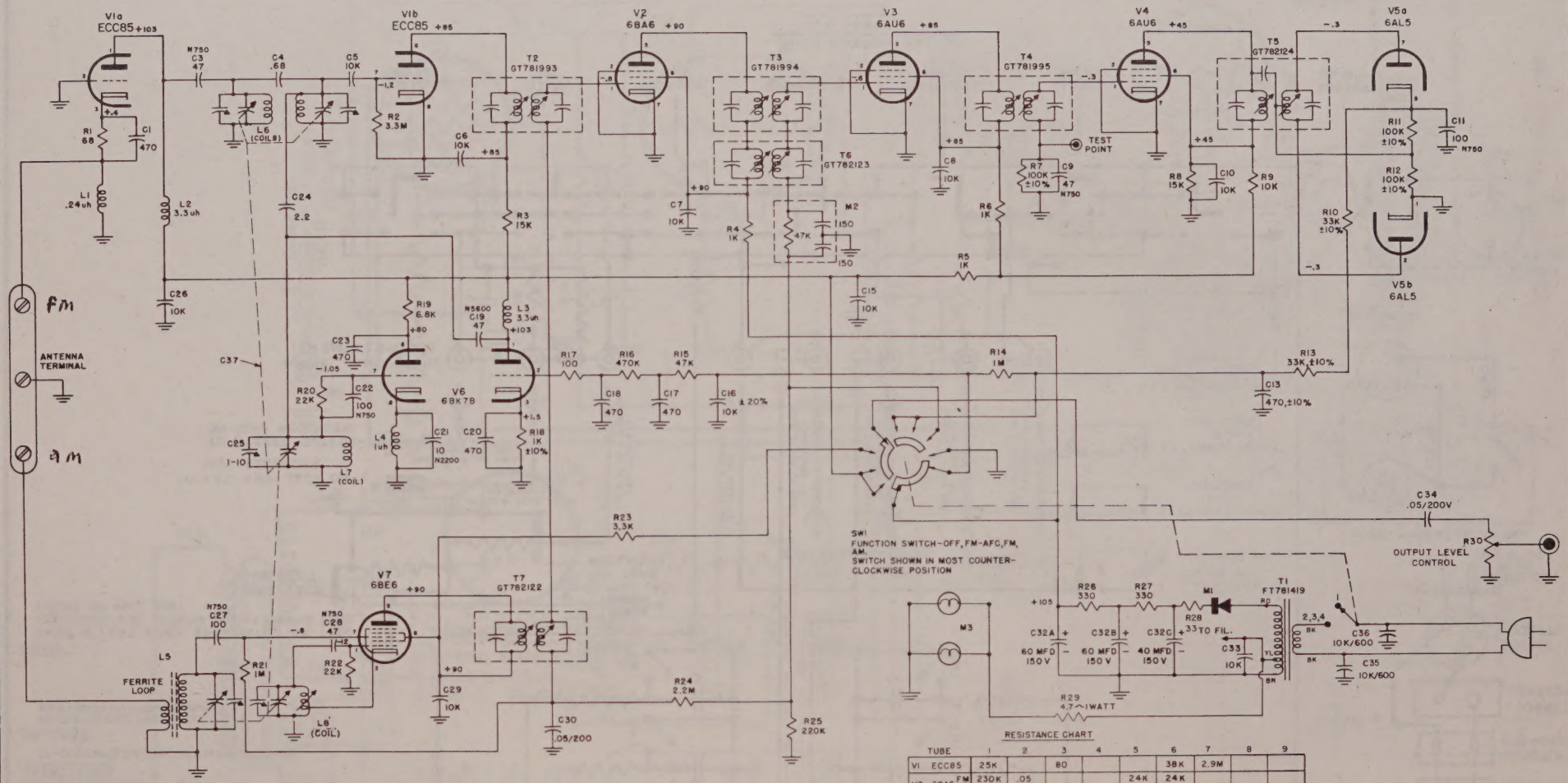

PUSH BUTTON SWITCH (VM 15467)

# CONTROL PANEL




✱ INDICATES PHASING TERMINAL OF SPEAKERS.
CAUTION- PHASE SPEAKERS PROPERLY

# MAIN AMPLIFIER




RESISTANCE CHART

| TUBE | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 ECC85 | | 25K | | 80 | | | 38K | 2.9M | | |
| V2 6BA6 | FM | 230K | .05 | | | 24K | 24K | | | |
| | AM | | | | | 25K | 25K | | | |
| V3 6AU6 | FM | 300K | | | | 22K | 22K | | | |
| | AM | 300K | | | | 22K | 22K | | | |
| V4 6AU6 | | 100K | | | | 12K | 12K | | | |
| V5 6AL5 | | | 100K | | | 180K | | 100K | | |
| V6 6BK7B | | 24K | 550K | 1K | | | 25K | 26K | | |
| V7 6BE6 | FM | 26K | | | | 500K | | 3.3M | | |
| | AM | 26K | | | | | | | | |

# V-M MODEL 1000

TUNER

Schematic Diagrams Courtesy of V M CORP.

PHOTOFACT* Folder

with CIRCUITRACE*

# PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

## IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

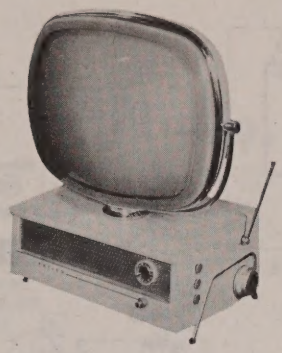
MODEL UG4242L (Ch. 9L37U)

PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)



MODEL UG4242L (Ch. 9L37U)

**CAUTION**

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

| | | | |
|---|---|---|---|
| TRADE NAME | Philco | MODELS | CHASSIS |
| | | G4242L, M, G4654L, M, W | 9L37 |
| | | UG4242L, M, UG4654L, M, W | 9L37U |
| MANUFACTURER | Philco Corp., Tioga & "C" Streets, Philadelphia, Pa. | | |
| TYPE SET | Television Receiver | | |
| TUBES | VHF-Sixteen, UHF-Seventeen | | |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycle | RATING 160 Watts, 1.56 Amp. @ 117 Volts AC | |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 9 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

SAFETY GLASS CLEANING

Use only mild soap and water to clean safety glass.

AGC

The AGC may be varied by a Local-Distance switch. (For location, see tube placement chart.)

FOCUS

The focus may be varied in steps by the position of a plug in the Focus Adjustment board.

WIDTH

The width may be varied by Width control. (For location, see tube placement chart.)

HIDDEN ADJUSTMENTS

The Vertical Linearity Adjustment is located under Brightness knob, the Height under Vertical Hold and Horizontal Range under Horizontal Hold.

HORIZONTAL LINEARITY

The Horizontal Linearity can be adjusted by means of a magnet located to the left of the yoke.

HORIZONTAL OSCILLATOR ADJUSTMENTS

Set the Horizontal Hold at the center of its range and remove the knob. Adjust the Horizontal Range (inner shaft) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Buzz control for MINIMUM buzz and maximum sound. (For location, see tube placement chart.)

FUSE DEVICE

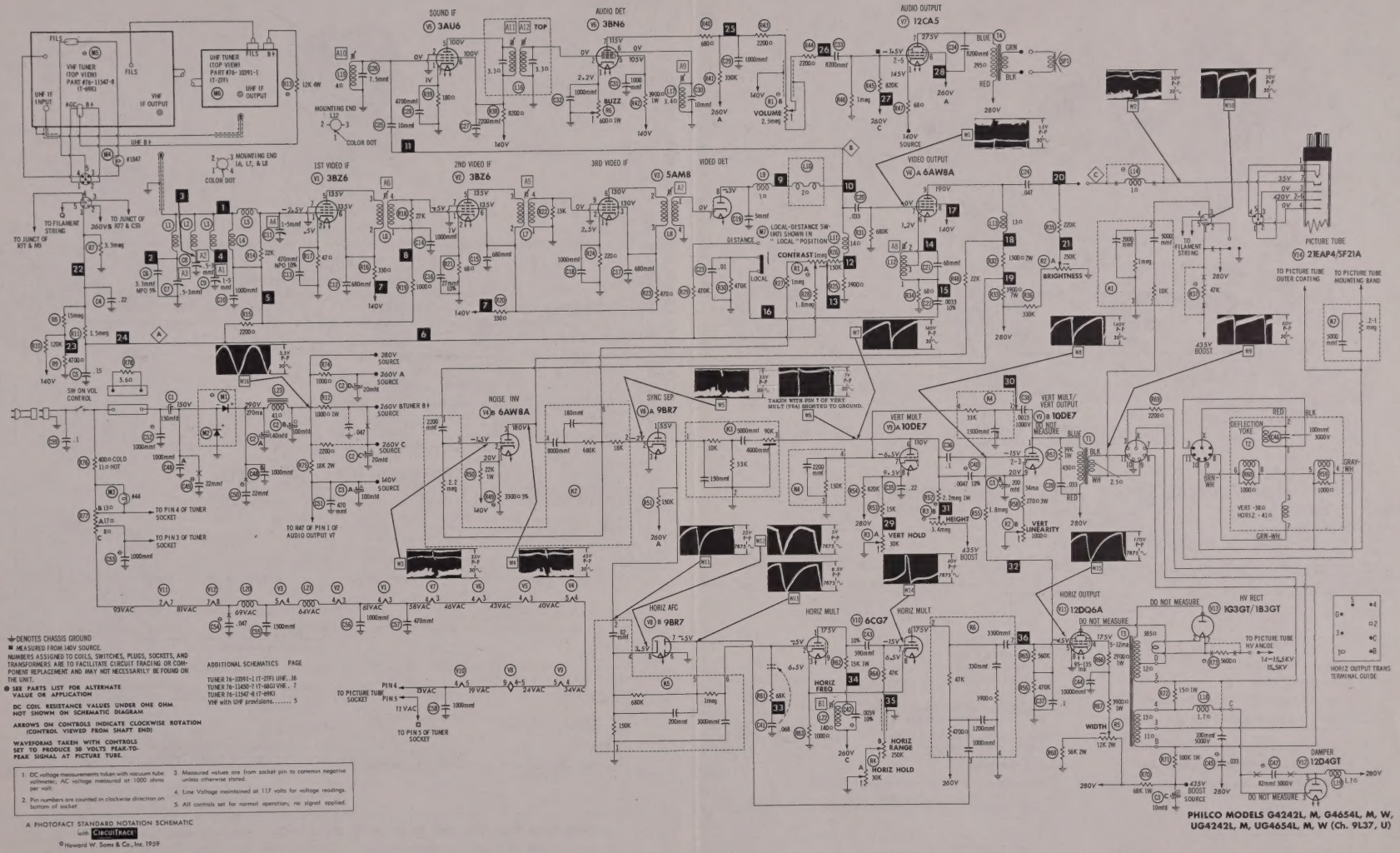
A 5.6Ω fusible resistor (R78) is used for low voltage power supply protection. (For location, see tube placement chart.)

CENTERING

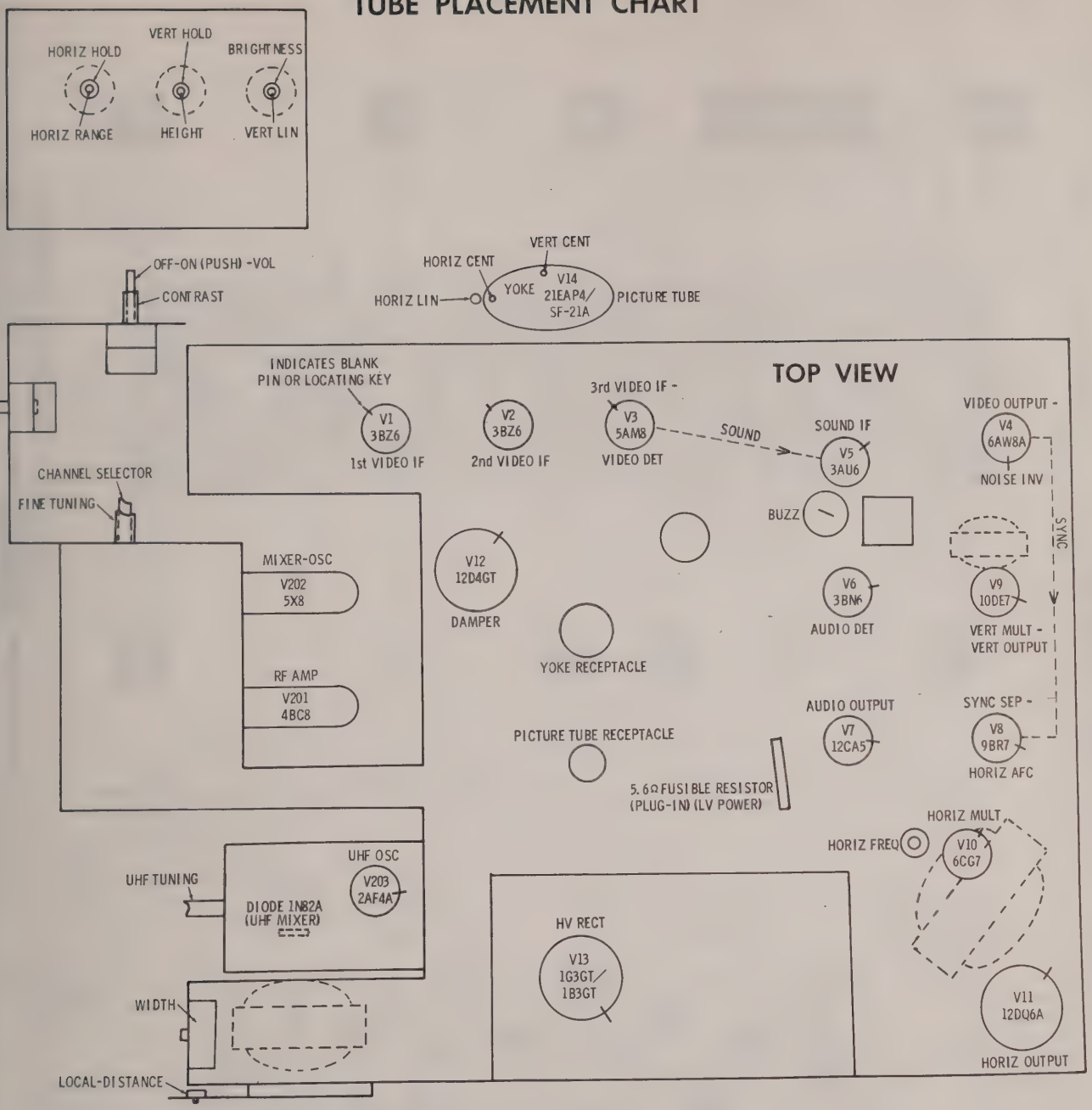
Centering is accomplished mechanically by adjustment of Vertical and Horizontal Centering Magnets.

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America


SOUND IF
V5 3AU6
AUDIO DET
V6 3BN6
AUDIO OUTPUT
V7 12CA5
1ST VIDEO IF
V1 3BZ6
2ND VIDEO IF
V2 3BZ6
3RD VIDEO IF
V3 5AM8
VIDEO DET
VIDEO OUTPUT
V4 A 6AW8A
NOISE INV
V4 B 6AW8A
SYNC SEP
V8 A 9BR7
VERT MULT
V9 A 10DE7
VERT MULT/VERT OUTPUT
V9 B 10DE7
HORIZ AFC
V8 B 9BR7
HORIZ MULT
V10 6CG7
HORIZ OUTPUT
V11 12DQ6A
HV RECT
V13 1G3GT/1B3GT
DAMPER
V12 12D4GT
PICTURE TUBE
V14 21EAP4/5F21A
VHF TUNER (TOP VIEW) PART #76-11547-8 (T-69K)
UHF TUNER (TOP VIEW) PART #76-10391-1 (T-27F)
UHF IF OUTPUT
VHF IF OUTPUT
UHF B+
MOUNTING END L32
COLOR DOT
L6, L7, & L8
TO FILAMENT STRING
TO JUNCT OF R77 & C55
TO JUNCT OF R77 & M9
SW ON VOL CONTROL
TO R87 OF PIN 1 OF AUDIO OUTPUT V7
TO PIN 4 OF TUNER SOCKET
TO PIN 3 OF TUNER SOCKET
TO PIN 4 OF TUNER SOCKET
TO PIN 5 OF TUNER SOCKET
TO PICTURE TUBE SOCKET
280V SOURCE
260V A SOURCE
260V BTUNER B+ SOURCE
260V C SOURCE
140V SOURCE
435V BOOST
435V BOOST SOURCE
VOLUME 2.5meg
BUZZ
DISTANCE
LOCAL-DISTANCE SW (NOT SHOWN IN "LOCAL" POSITION
CONTRAST 1meg
BRIGHTNESS 250K
VERT HOLD 30K
HEIGHT 3.4meg
VERT LINEARITY 1000Ω
HORIZ FREQ
HORIZ RANGE 250K
HORIZ HOLD 30K
WIDTH 12K 2W
HV ANODE
TO PICTURE TUBE OUTER COATING
TO PICTURE TUBE MOUNTING BAND
DEFLECTION YOKE
HORIZ OUTPUT TRANS TERMINAL GUIDE
DO NOT MEASURE
TAKEN WITH PIN 7 OF VERT MULT (V9A) GROUNDED TO GROUND.
93VAC
81VAC
69VAC
64VAC
61VAC
58VAC
40VAC
43VAC
40VAC
19VAC
24VAC
34VAC
11 VAC
15VAC
DENOTES CHASSIS GROUND
MEASURED FROM 140V SOURCE.
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
ADDITIONAL SCHEMATICS PAGE
TUNER 76-10391-1 (T-27F) UHF.. 16
TUNER 76-11450-7 (T-68G) VHF.. 7
TUNER 76-11547-8 (T-69K) VHF with UHF provisions..... 5
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
© Howard W. Sams & Co., Inc. 1959
PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

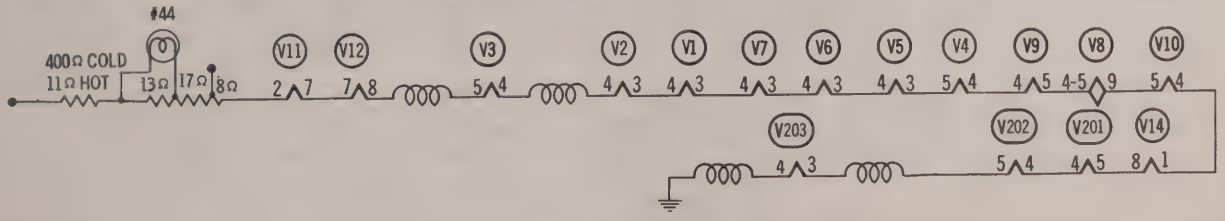
**POWER SUPPLY FAILURE**
No raster, no sound Fusible Resistor (5.6Ω), Rectifier (B+) .

**SWEEP FAILURE**
No raster, has sound V8, V10, V11, V12, V13, V14
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rectifier (B+)
Vert. off freq. V9
Horiz. off freq. V10

**LOSS OF PICTURE OR SOUND**
No pic, no sound, has raster V1, V2, V3
No pic, no sound, has snow V201, V202, V1, (V203 UHF only), Diode (UHF Mixer)
No pic, has sound, has raster V4, V14
Has pic, no sound V5, V6, V7

**SYNC FAILURE**
No vert. sync V8
No horiz. sync V8
No vert. or horiz. sync V8

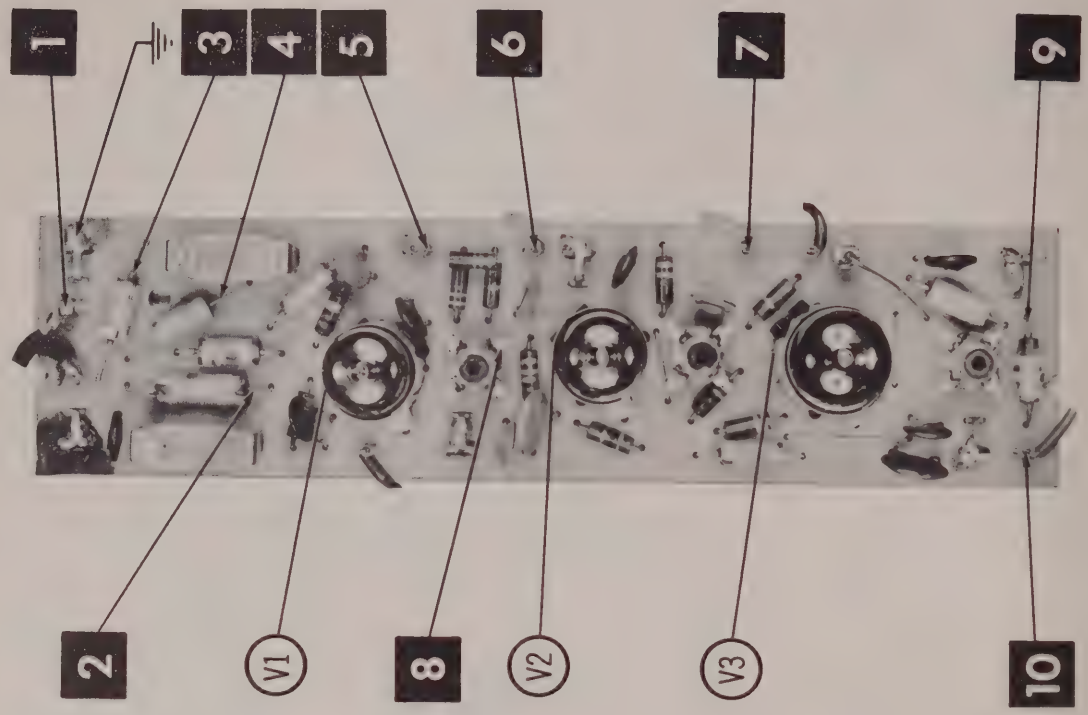
This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)




PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

FOLDER 1

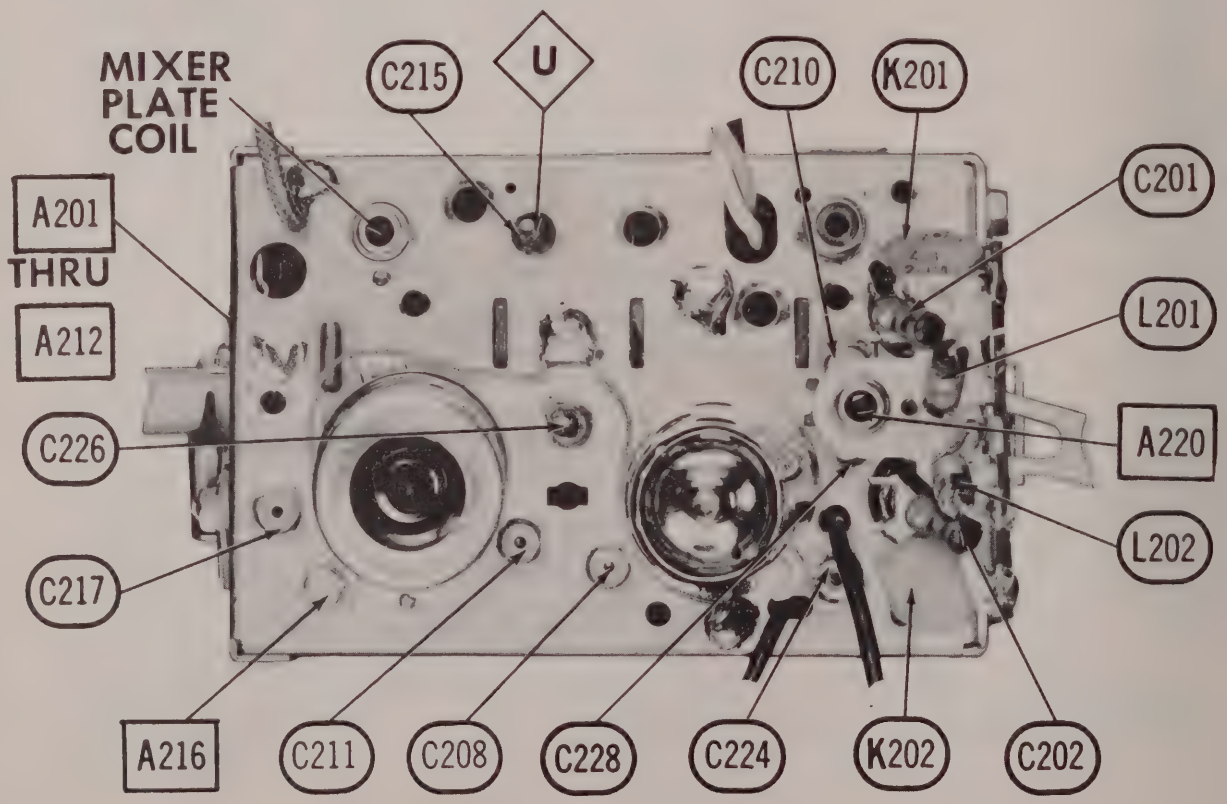
CircuiTrace Numbers 1 thru 10



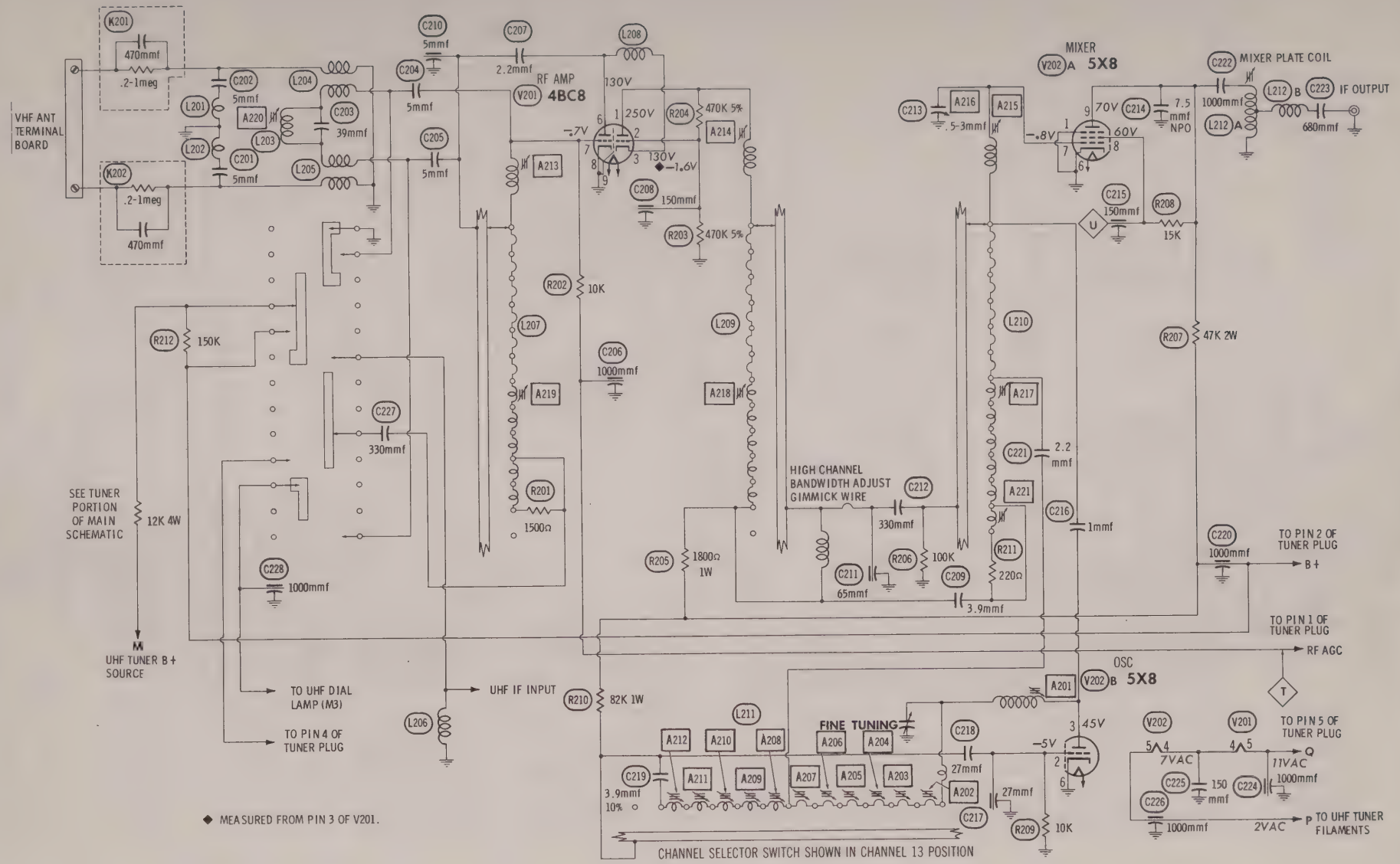

VIDEO IF - PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

A Howard W. Sams CIRCUITRACE Photo




TUNER 76-11547-8 - TOP VIEW




A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

## VHF TUNER with UHF provisions 76-11547-8 (T-69K)

PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

# TUNER PARTS LIST AND DESCRIPTIONS

## 76-11547-8, 76-10391-1

## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V201 | RF Amp. | 4BC8 | |
| V202 | Mixer-Osc. | 5X8 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V203 | UHF Osc. | 2AF4A | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA PHILCO PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C201 | 5 | | 30-1224-78 | SI 5 | | LT6V5 | ZT-555 | 5GA-V5 | |
| C202 | 5 | | 30-1224-78 | SI 5 | | LT6V5 | ZT-555 | 5GA-V5 | |
| C203 | 39 | | 62-039409011 | DI-000039 | DD-390 | L10Q39 | UC-5439 | 5GA-Q39 | |
| C204 | 5 | | 30-1224-78 | SI 5 | | LT6V5 | ZT-555 | 5GA-V5 | |
| C205 | 5 | | 30-1224-78 | SI 5 | | LT6V5 | ZT-555 | 5GA-V5 | |
| C206 | 1000 | | 30-1268-7 | EF-001 | MFT-1000 | | | 503C-D1 | |
| C207 | 2.2 | | 30-1221-6 | NPO-SI 2.2 | TCZ-2R2 | CTA6V22C | | 5TCCB-V22 | |
| C208 | 150 | | 30-1268-6 | | | | | | |
| C209 | 3.9 | | 30-1221-14 | | | | | | |
| C210 | 5 | | 30-1268-5 | | | | | | |
| C211 | 65 | | 30-1268-2 | | | | | | |
| C212 | 330 | | 30-1265-2 | BPD-00033 | DD-331 | L10T33 | UC-5333 | 5GA-T33 | |
| C213 | .5-3 | | 31-6520-25 | | 829-3 | | CT565A | | |
| C214 | 7.5 | | 30-1251-19 | | | | | | NPO |
| C215 | 150 | | 30-1268-6 | | | | | | |
| C216 | 1.0 | | 30-1224-82 | | | | | | |
| C217 | 27 | | 30-1268-4 | | | | | | |
| C218 | 27 | | 30-1224-146 | SI 27 | D6-270 | LT6Q27 | UC-5427 | 5GA-Q27 | |
| C219 | 3.9 | | 30-1221-14 | | | | | | 10% |
| C220 | 1000 | | 30-1268-7 | EF-001 | MFT-1000 | | | 503C-D1 | |
| C221 | 2.2 | | 30-1224-143 | NPO-SI 2.2 | TCZ-2R2 | CTA6V22C | | 5TCCB-V22 | |
| C222 | 1000 | | 30-1238-13 | BPD-001 | DD-102 | BYA6D1 | DC521 | 5HK-D1 | |
| C223 | 680 | | 30-1238-22 | BPD-00068 | DD-681 | BYA10T68 | UC-5368 | 5GA-T68 | |
| C224 | 1000 | | 30-1268-7 | EF-001 | MFT-1000 | | | 503C-D1 | |
| C225 | 150 | | 30-1265-3 | BPD-00015 | DD-151 | L10T15 | UC-5315 | 5GA-T15 | |
| C226 | 1000 | | 30-1268-7 | EF-001 | MFT-1000 | | | 503C-D1 | |
| C227 | 330 | | 30-1265-2 | BPD-00033 | DD-331 | L10T33 | UC-5333 | 5GA-T33 | |
| C228 | 1000 | | 30-1268-7 | EF-001 | MFT-1000 | | | 503C-D1 | |
| C229 | .68 | | 30-1221-11 | | TCZ-R68 | | | | |
| C230 | 30 | | 76-10170 | | | | | | |
| C231 | 15 | | 30-1224-133 | | | | | | N1500 ±.25mmf |
| C232 | .5-3 | | 31-6520-1 | | 829-3 | | CT565A | | |
| C233 | 250 | | 30-1261 | | | | | | |
| C234 | 1000 | | 30-1258 | EF-001 | MFT-1000 | | | 503C-D1 | |
| C235 | 1000 | | 30-1258 | EF-001 | MFT-1000 | | | 503C-D1 | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | PHILCO PART No. | NOTES |
|---|---|---|---|---|
| R201 | 1500Ω | | 66-2158340 | |
| R202 | 10K | | 66-3108340 | |
| R203 | 470K 5% | | 66-4478240 | |
| R204 | 470K 5% | | 66-4478240 | |
| R205 | 1800Ω | 1 | 66-2184340 | |
| R206 | 100K | | 66-4108340 | |
| R207 | 47K | 2 | 66-3475340 | |
| R208 | 15K | | 66-3158340 | |

| ITEM No. | RATING OHMS | RATING WATT | PHILCO PART No. | NOTES |
|---|---|---|---|---|
| R209 | 10K | | 66-3108340 | |
| R210 | 82K | 1 | 66-3824340 | |
| R211 | 220Ω | | 66-1228340 | |
| R212 | 150K | | 66-4158340 | |
| R213 | 470K | | 66-4478340 | |
| R214 | 5600Ω | | 66-2568340 | |
| R215 | 1500Ω | | 66-2158340 | |

## COILS (RF-IF)

| ITEM No. | USE | PHILCO PART No. | NOTES |
|---|---|---|---|
| L201 | RF Choke | 32-4645-37 | |
| L202 | RF Choke | 32-4645-37 | |
| L203 | IF Trap | 32-4719-2 | |
| L204 | VHF Ant. Trans. | 32-4725 | |
| L205 | VHF Ant. Trans. | 32-4725 | |
| L206 | RF Choke | 32-4726-10 | |
| L207 | Ant. Coils | 76-10112 | Channel 2-13, Includes wafer assy. |
| L208 | Cathode Choke | 32-4652-51 | |
| L209 | RF Coils | 328-0116 | Channel 2-13, Includes wafer assy. |
| L210 | Mixer Grid Coils | 76-10110 | Channel 2-13, Includes wafer assy. |

| ITEM No. | USE | PHILCO PART No. | NOTES |
|---|---|---|---|
| L211 | Osc. Coils | 328-0113 | Channel 2-13, Includes wafer assy. |
| L212A | Mixer Plate Coil | 32-4629-9 | |
| B | RF Choke | | |
| L213 | UHF Ant. Input Assy. | 76-10072 | Includes C229, R213 |
| L214 | Cathode Choke | 32-4642-4 | |
| L215 | Fil. Choke | 32-4642-3 | |
| L216 | Fil. Choke | 32-4652-44 | |
| L217 | RF Choke | 76-10170 | Includes crystal panel assy. |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | PHILCO PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K201 | Antenna Isolation Network | 470mmf, .2-1meg | 30-6028-1 | Centralab<br>Sprague | RC-471<br>AC1-1 |
| K202 | Antenna Isolation Network | 470mmf, .2-1meg | 30-6028-1 | Centralab<br>Sprague | RC-471<br>AC1-1 |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA PHILCO PART No. | REPLACEMENT DATA CBS PART No. | REPLACEMENT DATA SYLVANIA PART No. | NOTES |
|---|---|---|---|---|---|
| M201 | 1N82A | 34-8027 | 1N82A | 1N82A | UHF Mixer (Clip-in) |

VHF TUNER 76-11450-7 (T-68G)
RF AMP 4BC8
MIXER A 5X8
OSC B 5X8
5X8
4BC8
IF OUTPUT
MIXER PLATE COIL
RF AGC
B+
TO FILAMENT STRING
FINE TUNING
HIGH CHANNEL BANDWIDTH ADJUST GIMMICK WIRE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
VHF ANT TERMINAL BOARD
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

# TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggest alignment tools:

| | |
|---|---|
| A201 thru A212 | General Cement #5097 or 8727<br>Walsco |
| A213 thru A215 | General Cement #9291<br>Walsco #2520, 2522 |
| A216 | General Cement #5000, 5003, 5004, 5008, 5009, 8276 or 9291<br>Walsco #2515, 2520, 2522, 2525 or 2537 |
| A217, A218, A221 | General Cement #5000, 5003, 8276, 8290 or 8609<br>Walsco #2525 |
| A219 | General Cement #8606, 8606L or 9091<br>Walsco #2542, 2543 or 2544 |
| A220 | General Cement #8282, 8606, 8606L or 9295<br>Walsco #2543, 2544, 2545 |

VHF OSCILLATOR ALIGNMENT

The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough signal generator output to provide a usable indication on scope.
This procedure uses the traps of the Video IF strip. They must be in proper alignment before attempting to align the oscillator.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | Two 120Ω Carbon Resistors | Across VHF antenna terminals with 120Ω in each lead. | 209.75MC (400∿ 50% AM Mod) | 13 | Across Video Detector load. | A201 | Adjust for MINIMUM 400∿ indication. |
| | | | 203.75MC | 12 | | A202 | |
| | | | 197.75MC | 11 | | A203 | |
| | | | 191.75MC | 10 | | A204 | |
| | | | 185.75MC | 9 | | A205 | |
| | | | 179.75MC | 8 | | A206 | |
| | | | 173.75MC | 7 | | A207 | |
| | | | 81.75MC | 6 | | A208 | |
| | | | 75.75MC | 5 | | A209 | |
| | | | 65.75MC | 4 | | A210 | |
| | | | 59.75MC | 3 | | A211 | |
| | | | 53.75MC | 2 | | A212 | |

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point (T). Positive to chassis.
Detune Mixer Plate Coil by connecting a 10 to 20mmf capacitor across it temporarily.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 2. | Two 120Ω Carbon Resistors | Across VHF antenna terminals with 120Ω in each lead. | 213MC | 211.25MC<br>215.75MC | 13 | Vert. Amp. thru 10K to point (D). Low side to chassis. | A213 | Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown. |
| 3. | " | " | " | " | " | " | A214, A215 | Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown. Adjust A214 to set marker positions, A215 for proper tilt. |
| 4. | " | " | 177MC | 175.25MC | 7 | " | A216 | Adjust to obtain correct tilt on top of curve as in Fig. 202 to compensate for the tuning effect of channel 13. |
| 5. | " | " | 213MC | 213MC | 13 | " | | Retouch A214 and A215 SLIGHTLY for symmetrical response centered about marker. Repeat steps 4 and 5 alternately until optimum response is obtained on channels 7 and 13. |
| 6. | " | " | 85MC | 85MC | 6 | " | A217, A218, A219 | Turn A217 counterclockwise until a single peak appears. (DO NOT unscrew far enough to allow the core to fall out.) Adjust A218 until peak falls at 85MC. (It may be necessary to increase sweep generator output.) Adjust A219 for maximum amplitude and symmetry of single peak. |
| 7. | " | " | 85MC | 83.25MC<br>87.75MC | " | " | | Retouch A217 and A218 for response similar to Fig. 203. |
| 8. | " | " | Not used | 43.5MC (400∿ 30% AM Mod) | 4 | " | A220 | Adjust for MINIMUM scope indication. |

CONTINUED PAGE 13

# ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A4 ..... General Cement #8607, 9291 or 9294
Walsco #2520, 2522, 2523 or 2537
A5 thru A12, ..... General Cement #8282, 8606, 8606L or 9295
Walsco #2543, 2544 or 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Direct | High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis. | Not used. | 47.4MC (400~ 30% AM Mod) | 4 | Vert. Amp. thru 10K to point (B). Low side to chassis. (Across video detector load). | Mixer Plate Coil | Adjust for maximum deflection. |
| 2. | " | " | " | 41.25MC (Crystal Accuracy) | " | " | A1 | Increase generator output. Adjust for MINIMUM 400~ indication. |
| 3. | " | " | " | 47.4MC (Crystal Accuracy) | " | " | A2, A3 | Increase generator output. Adjust for MINIMUM 400~ indication. Repeat steps 2 and 3. |
| 4. | " | " | " | 45.0MC | " | " | Mixer Plate Coil | Adjust for maximum 400~ indication on scope. |
| 5. | " | " | " | 42.7MC | " | " | A4, A5 | " |
| 6. | " | " | " | 45.75MC | " | " | A6 | " |
| 7. | " | " | " | 43.85MC | " | " | A7 | " |
| 8. | Two 120Ω Carbon Resistors | Across antenna terminals with 120Ω in each lead. | " | 65.75MC | " | " | Fine Tuning | Adjust Fine Tuning for MINIMUM 400~ indication on scope. DO NOT change Fine Tuning during balance of alignment. |
| 9. | " | " | 69MC (10MC Swp) | 42.7MC<br>43.85MC<br>45.0MC<br>45.75MC | " | " | | Check for response similar to Fig. 1. If necessary, retouch Mixer Plate Coil to set carrier level, A7 to adjust curve limit, A5 and A4 to adjust low frequency slope of curve and A6 to adjust high frequency side. |

4.5MC TRAP ALIGNMENT

The detector used in alignment of the 4.5MC trap must first be padded by connecting to an accurate source of 4.5MC and a VTVM to the output.
Adjust the slug for maximum deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 10. | .005mfd | High side to point (B). Low side to chassis. | 4.5MC (400~ 30% AM Mod) | Any non-interfering channel | DC probe thru detector probe (Fig. 2) to cathode of picture tube (point (C)). Common to chassis. | A8 | Adjust for MINIMUM deflection. |

SOUND IF ALIGNMENT

Tune in a weak station signal (antenna disconnected) and adjust for best picture. Do not change setting of Fine Tuning during balance of alignment.
Connect the antenna for a strong signal. Adjust A9 for maximum sound. Use peak furthest counterclockwise.
Disconnect antenna. Adjust A10, A11 and A12 for maximum sound.
Connect antenna. Retouch A9 for maximum sound.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 8 & 13

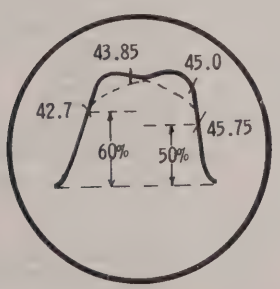



FIG. 1

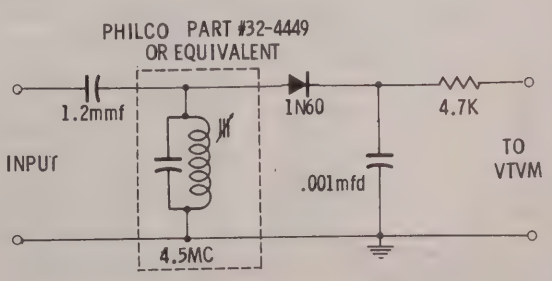



FIG. 2

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | 1st Video IF Amp. | 3BZ6 | |
| V2 | 2nd Video IF Amp. | 3BZ6 | |
| V3 | 3rd Video IF Amp. - Video Det | 6AM8 | |
| V4 | Video Output-Noise Inv | 6AW8A | |
| V5 | Sound IF Amp | 3AU6 | |
| V6 | Audio Det | 3BN6 | |
| V7 | Audio Output | 12CA5 | |
| V8 | Sync Sep.-Horiz. AFC | 9BR7 | |
| V9 | Vert. Mult. - Vert. Output | 10DE7 | |
| V10 | Horiz Mult. | 8CG7 | |
| V11 | Horiz. Output | 12DQ6A | |
| V12 | Damper | 12D4GT | |
| V13 | HV Rect. | 1G3GT/ 1B3GT | |

## PICTURE TUBE

| ITEM No | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | PHILCO PART No | GENERAL ELECTRIC PART No | RCA PART No | SYLVANIA PART No | |
| V14 | 21EAP4/ 21F-21A | | | 21EAP4/ 21F-21A ① | ① "Silver Screen 85" |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | PHILCO PART No | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No | PYRAMID PART No | SPRAGUE PART No. | |
| C1 | 150 | 300 | 30-2568-75 ① | AFHS1-23 | XAO361 | FPU7 | TMS-24 | TVL-1529 TVL5-4568 * | |
| C2A | 40 | 350 | 30-2590-40 | AFH94-02-70 | | | | | |
| B | 80 | 300 | | | | | | | |
| C | 20 | 300 | | | | | | | |
| D | 20 | 300 | | | | | | | |
| C3A | 100 | 200 | 30-3590-37 | XEH1-177-50 | | | | TVLS-3708.2* | |
| B | 200 | 25 | | | | | | | |
| C | 80 | 450 | | | | | | | |

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① Some versions may use a 140mfd ② 150VDC with same part number.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | PHILCO PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C4 | .22 | 200 | | 30-4670-49 | P288N-33 | | CUB2P23 | GEM-2022 | 2TM-P22 | |
| C5 | .15 | 200 | | 30-4650-48 | P288N-15 | | CUB2P15 | GEM-2015 | 2TM-P15 | |
| C6 | 3.3 | | NPO 5% | 30-1363-38 | NPO-DI 3.3 | DTZ-3R3 | C10Y33C | CNO-533 | 5TCCB-V33S 5%* | |
| C7 | 5-5 | | | 31-6535-1 | | 529-3 | | | | |
| C8 | 3-5 | | | 31-6535-1 | | 529-3 | | | | |
| C9 | 1-5 | | | 31-6535-2 | | 529-6 | | | | |
| C10 | 1000 | | | 30-1363-11 | BPD-001 | DD-102 | BYA10DLM | B-210 | 6HE-D1 | |
| C11 | 1-5 | | | 31-6535-1 | | 529-6 | | | | |
| C12 | 680 | | | 30-1362-15 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C13 | 470 | | NPO 10% | 30-1363-38 | | | | | | |
| C14 | 1000 | | | 30-1363-11 | BPD-001 | DD-102 | BYA10DLM | B-210 | 5HK-D1 | |
| C15 | 680 | | | 30-1362-15 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C16 | 27 | | 10% | 30-1363-6 | DI 27 | DD-270 | L10Q27 | CNO-427 | 5GA-Q27S 10% * | |
| C17 | 680 | | | 30-1362-15 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C18 | 1000 | | | 30-1362-11 | BPD-001 | DD-102 | BYA10DLM | B-210 | 5HK-D1 | |
| C19 | 5 | | | 30-1363 | DI 5 | DD-050 | L10V5 | Z7-555 | 5GA-V5 | |
| C20 | .033 | 300 | | 30-4650-44 | P288N-033 | | CUB3S33 | GEM-4133 | 4TM-S33 | |
| C21 | 68 | | | 30-1363-4 | BPD-000068 | DD-680 | L10Q68 | CNO-468 | 5GA-Q68 | |
| C22 | .0033 | 600 | 10% | 30-4651-34 | | | P68D33 | GEM-16333 | 6TM-D33S 10% * | |
| C23 | .01 | 600 | | 30-4650-58 | P688N-01 | DS-103 | CUB6S1 | GEM-611 | 6TM-S1 | |
| C24 | .047 | 400 | | 30-4650-45 | P488N-047 | DF-503 | CUB5S47 | GEM-4147 | 4TM-S47 | |
| C25 | 1.0 | | | 30-1221-25 | NPO-BI 1.0 | TCZ-1 | L10G1 | CNO-510 | 5TCCB-V1 | |
| C26 | 7.5 | | | 31-1363-27 | | | | | | |
| C27 | 2200 | | | 30-1362-7 | BPD-0022 | DD-222 | BYA10D22 | B-222 | 5HK-D22 | |
| C28 | 4700 | | | 30-1362-3 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C29 | 1000 | | | 30-1362-11 | BPD-001 | DD-102 | BYA10DLM | B-210 | 5HK-D1 | |
| C30 | 10 | | | 30-1363-38 | BPD-00001 | DD-100 | L10Q1 | CNO-410 | 5GA-Q1 | |
| C31 | 1000 | | | 30-1362-13 | BPD-001 | DD-102 | BYA10DLM | B-210 | 5HK-D1 | |
| C32 | 1000 | | | 30-1362-13 | BPD-001 | DD-103 | BYA10DLM | B-210 | 5HK-D1 | |
| C33 | 8200 | | | 30-1362-1 | BPD-008 | | | B-282 | | |
| C34 | 8200 | | | 30-1362-2 | BPD-008 | | | B-282 | | |
| C35 | .22 | 100 | | 30-468-6 | P288N-22 | | CUB2P22 | GEM-2022 | 2TM-P22 | |
| C36 | .1 | 400 | | 30-4650-47 | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C37 | .1 | 300 | | 30-4650-47 | P288N-1 | DF-104 | CUB4P1 | GEM-201 | 2TM-P1 | |
| C38 | .0015 | 1000 | | 30-4650-57 | P108N-0015 | DD-152 | CUB1D15 | GEM-1015 | 1GTM-D15 | |
| C39 | .033 | 400 | | 30-4650-44 | P488N-033 | | CUB4S33 | GEM-4133 | 4TM-S33 | |
| C40 | .0047 | 400 | 10% | | | | P68D47 | GEM-16347 | 5BF-D47 | ① |
| C41 | .068 | 200 | | 30-4684-29 | P288N-068 | | CUB6S68 | GEM-4168 | 4TM-S68 | |
| C42 | .0039 | 200 | 10% | 30-4651-35 | | | P68M39 | GEM-1634 | 5BF-D39 | ① |
| C43 | 390 | | 10% | 30-1364-1 | BPD-00039 | | 5RST39 | MCB343 | MS-339 | |
| C44 | 10000 | | | 30-1338-2 | BPD-01 | DD-103 | BYA10S | B-310 | 6HE-S | |
| C45 | .033 | 400 | | | P488N-033 | | CUB4S33 | GEM-4133 | 4TM-S33 | ② |
| C46 | 100 | 3000 | | 30-1264-14 | HVD-30-100 | DD30-101 | HVB30T1 | 3DY-310 | 30CA-T1 | |
| C47 | 82 | 5000 | | | HVD-50-82 | DD50-820 | | | 5EK-Q82S * | ② |
| C48A | 1000 | | | 30-1239-8 | BPD-21K01 | DD8-103 | BYD5D1K | B-210 | 5HK-K1A | |
| B | 1000 | | | | | | | B-210 | | |
| C49 | 22 | | | | BPD-000022 | DD-220 | L10Q22 | CNO-422 | 5GA-Q22 | ② |
| C50 | 22 | | | | BPD-000022 | DD-220 | L10Q22 | CNO-422 | 5GA-Q22 | ② |
| C51 | 470 | | | 30-1238-10 | BPD-00047 | DD-471 | BYA10T47 | B-347 | 5GA-T47 | |
| C52 | 1000 | | | 30-1338-3 | BPD-001 | DD-102 | BYA10DLM | B-210 | 5HK-D1 | ④ |
| C53 | 1000 | | | 30-1238-3 | BPD-001 | DD-103 | BYA10DLM | B-210 | 6HE-D1 | ④ |
| C54 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | ② |
| C55 | 1500 | | | 30-1362-9 | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | |
| C56 | 1000 | | | 30-1362-11 | BPD-001 | DD-102 | BYA10DLM | B-210 | 5HK-D1 | |
| C57 | 470 | | | 30-1362-16 | BPD-00047 | DD-471 | BYA10T47 | B-347 | 5GA-T47 | |
| C58 | 1000 | | | 30-1238-3 | BPD-001 | DD-103 | BYA10DLM | B-210 | 6HE-D1 | |
| C59 | .1 | 600 | | 30-4650-54 | P688N-1 | DF-104 | CUB6P1 | GEM-601 | 6TM-P1 | |

① Some versions may use .0056mfd ② 400V in this application (Part #30-4651-11).
② Some versions may use .047mfd ② 400V in this application (Part #30-4650-45).
③ Not used in some versions.
④ Not used in Ch. 9L37.
*Not normally in distributors stock. Available thru distributor on order to manufacturer.

## CONTROLS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | PHILCO Part No. | CENTRALAB Part No | CLAROSTAT Part No. | IRC Part No. | MALLORY Part No. | |
| R1A | 1meg | ½ | 33-5592-42 | | | | ¶ UZ3948-8 | Contrast, Note 1 |
| B | 2.5meg | ½ | | | | | | Volume, Note 1 |
| C | Switch | | | | | | | Push-Push Switch |
| R2A | 250K | ½ | 33-5592-32 | F1-34 | | † QJ-999 | † UZ3949 | Brightness |
| B | 1000Ω | ½ | | R2-4 * | | | | Vert. Linearity |
| R3A | 30K | ½ | 33-5592-28 | | | †† QJ-1095 | †† UZ3950 | Vert. Hold, Note 2 |
| B | 3.4meg | ½ | | | | | | Height, Note 2 |
| R4A | 30K | ½ | 33-5592-33 | F1-28 | | ■ QJ-1094 | ▪ UZ3781 | Horiz. Hold |
| B | 250K | ½ | | R2-34 * | | | | Horiz. Range |
| R5A | 12K | 2(WW) | 33-5574-3 | WN-153 | | W11-217 | | Width |
| B | Shaft | | | Not Req. | | SK3 | | |
| R6 | 600Ω | 1(WW) | 33-5591-6 | | | | | Buzz |

Note 1. Runs 1 thru 6 use 2meg Contrast, 2.5meg Volume (Part #33-5592-34).
Note 2. Runs 1 thru 4 use 30K Vert. Hold, 2.5meg Height (Part #33-5592-22).
† "Concentrikit" Equivalent: K-5 Kit with Base Elements & Shafts: Bil-130, P1-024 (Panel) (Not available as a factory assembled unit) Bil-108, R15-005 (Rear)
† "STA-LOC" Equivalent: FA354L, G6687, RU13L, IB437.
†† "Concentrikit" Equivalent: K-5 Kit with Base Elements & Shafts: Bil-131, P1-024 (Panel) (Not available as a factory assembled unit) Bil-141, R15-005 (Rear)
†† "STA-LOC" Equivalent: FA34L, G6687, RU46L, IB437.
■ "Concentrikit" Equivalent: K-5 Kit with Base Elements & Shafts: Bil-121, P1-024 (Panel) (Not available as a factory assembled unit) Bil-130, R15-005 (Rear)
▪ "STA-LOC" Equivalent: FA34L, G6887, RU254L, IB437.
* Cut and split inner shaft before assembling.
¶ "STA-LOC" Equivalent: FA48R, RUF254L, OG437.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | PHILCO PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R7 | 3.3meg | | 66-5338340 | |
| R8 | 15meg | | 66-5158340 | |
| R9 | 47MΩ | | 66-3478340 | |
| R10 | 150K | | 66-4158340 | |
| R11 | 1.5meg | | 66-5158340 | |
| R12 | 1000Ω | 1 | 66-2108340 | |
| R13 | 18K | 4 | 33-1363-11 | Note 1 |
| R14 | 22K | | 66-2228340 | |
| R15 | 2200Ω | | 66-2228340 | |
| R16 | 330Ω | | 66-1338340 | |
| R17 | 47Ω | | 66-0478340 | |
| R18 | 47K | | 66-3478340 | |
| R19 | 1000Ω | | 66-2108340 | |
| R20 | 330Ω | | 66-1338340 | |
| R21 | 330Ω | | 66-0668340 | |
| R22 | 15K | | 66-3158340 | |
| R23 | 470Ω | | 66-1478340 | |
| R24 | 330Ω | | 66-1338340 | |
| R25 | 3900Ω | | 66-2398340 | |
| R26 | 150K | | 66-4158304 | |
| R27 | 1meg | | 66-5108340 | |
| R28 | 1.5meg | | 66-5158340 | |
| R29 | 470K | | 66-4478340 | |
| R30 | 470K | | 66-4478340 | |
| R31 | 680K | | 66-4688340 | |
| R32 | 1500Ω | 2 | 66-2158340 | |
| R33 | 3900Ω | ½ | 66-1263-34 | |
| R34 | 68Ω | | 66-0688340 | |
| R35 | 220K | | 66-4228340 | |
| R36 | 330K | | 66-4338340 | |
| R37 | 47K | | 66-3478340 | Note 2 |
| R38 | 5300Ω | | 66-2538340 | |
| R39 | 180Ω | | 66-1188340 | |
| R40 | 680Ω | | 66-1688340 | |
| R41 | 330K | | 66-4338340 | |
| R42 | 3900Ω | 1 | 66-2398340 | |
| R43 | 2200Ω | | 66-2228340 | |
| R44 | 2200Ω | | 66-2228340 | |

| ITEM No. | RATING | | PHILCO PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R45 | 820K | | 66-4828340 | |
| R46 | 1meg | | 66-5108340 | |
| R47 | 68Ω | | 66-0688340 | |
| R48 | 22K | | 66-2228340 | |
| R49 | 3300Ω 5% | | 66-3338240 | Note 3 |
| R50 | 22K | 1 | 66-3234340 | |
| R51 | 150K | | 66-4158340 | |
| R52 | 2.2meg | 1 | 66-5228340 | Note 4 |
| R53 | 15K | | 66-3158340 | |
| R54 | 820K | | 66-4828340 | |
| R55 | 1.5meg | | 66-5188340 | |
| R56 | 470K | | 66-4478340 | |
| R57 | 39K | 1 | 66-3394340 | |
| R58 | 270Ω | 3 | 33-1363-19 | |
| R59 | 1000Ω | | 66-2108340 | |
| R60 | 1000Ω | | 66-2108340 | |
| R61 | 68K | | 66-3688340 | |
| R63 | 15K | 1 | 66-3154340 | |
| R63 | 1000Ω | | 66-2108340 | |
| R64 | 47K | | 66-3478340 | |
| R65 | 56K | | 66-4568340 | |
| R66 | 2700Ω | 1 | 66-2274340 | |
| R67 | 2900Ω | 1 | 66-2394340 | |
| R68 | 56K | 2 | 66-4568340 | |
| R69 | 2200Ω | | 66-2228340 | |
| R70 | 68K | 1 | 66-3684340 | |
| R71 | 100K | 1 | 66-4104340 | |
| R72 | 15Ω | 1 | 66-0154340 | |
| R73 | 5600Ω | | 66-2568340 | Note 5 |
| R74 | 1000Ω | | 66-2108340 | |
| R75 | 18K | 2 | 66-3188340 | |
| R76 | 4000 Cold | | 33-1363-11 | |
| | 1kΩ Hot | | | |
| R77A | 13Ω | | | |
| B | 17Ω | | 33-1368-10 | |
| C | 8Ω | | | |
| R78 | 5.6Ω | | 33-1366-3 | |

Note 1. Not used in Ch. 9L37.
Note 2. Not used in chassis stamped Run 1 or 2.
Note 3. Printed boards with yellow dot use 3600Ω 5% in this application (Part #66-2368340).
Note 4. Printed boards with orange dot use 2.7meg 1W in this application (Part # 66-5274340).
Note 5. Not used in some versions.

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | PHILCO Part No. | Meissner Part No. | Merit Part No. | Miller Part No. | Ram Part No. | |
| L1 | 47.4MC Trap | 32-4645-33 | 19-1001 | BC-562 | 4604 | | |
| L2 | 47.4MC Trap | 32-4645-19 | 19-1002 | BC-563 | 4606 | | |
| L3 | 41.25MC Trap | 32-4635-34 | | | | | |
| L4 | RF Choke | 32-4645-20 | | | 4584 | | .33 Microhenry |
| L5 | 1st Video IF | 32-4645-36 | 19-3001 | TV-189 | 6175 | VP-9 ④ | .88 Microhenry |
| L6 | 2nd Video IF | 32-4696-2 | | | | | |
| L7 | 3rd Video IF | 32-4686-2 | | | | | |
| L8 | 4th Video IF | 32-4686-3 | | | | | |
| L9 | Resonant Choke | 32-4645-7 | | | | | 3 Microhenries |
| L10 | Resonant Choke | 32-4674-1 | | | | | 22 Microhenries |
| L11 | Series Peaking Coil | 32-4752-12 | 19-3500 | TV-203 | 6138 | VP-8 | 470 Microhenries |
| L12 | 4.5MC Trap | 32-4645-15 | | | | | |
| L13 | Shunt Peaking Coil | 32-4752-11 | 19-3375 | TV-201 | 6134 | | 390 Microhenries |
| L14 | RF Choke | | | | | | 6.5 Microhenries ① |
| L15 | 1st Sound IF | 32-4644-12 | | | | | |
| L16 | 2nd Sound IF | 32-4745-2 | | | | | |
| L17 | Quadrature Coil | 32-4644-13 | | | | | |
| L18 | Resonant Choke | 32-4113-50 | | | | | 11 Microhenries |
| L19 | Resonant Choke | 32-4113-50 | | | | | 11 Microhenries |
| L20 | FIL. Choke | 32-4645-35 | | | | | |
| L21 | FIL. Choke | 32-4645-35 | | | | | |

① Not used in some versions.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | PHILCO PART No | Meissner PART No | Merit PART No. | Miller PART No. | Ram PART No | Thordarson PART No | |
| L22 | 140Ω | | 32-4754-3 | | | | | | Horiz. Freq. |

## FILTER CHOKE

| ITEM No | RATINGS | | | REPLACEMENT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | DC RES | INDUCTANCE @ CURRENT 1000 (%) | PHILCO PART No | Halldorson PART No | Merit PART No. | Ram PART No | Stancor PART No | Thordarson PART No | Triad PART No |
| L23 | .270A | 41Ω | 1.3 Hy. | 32-5710-4 | | | | | 26C44 | |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No. | USE | REPLACEMENT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PHILCO PART No | Halldorson PART No | Merit PART No. | Ram PART No | Rogers PART No | Stancor PART No | Thordarson PART No | Triad PART No |
| T1 | Vert. Output | 32-5829-2 | Z1900 ① | A-2823 | | | A-8142 ② | 26S72 Y-53 ③ | A-108X |
| T2 | Yoke(Horiz. 24MH) (1109)(Vert. 38.5MH) Rear Cover & Centering Device & Yoke Clamp | 76-10513-6 | | | | | | | |
| T3 | Horiz. Output | 32-5853-1 | | | | | | | |

① Use 8 to 1 turns ratio.
② Drill new mounting hole(s).
③ Remove jumper from yoke terminals #1 and #7, use original rear cover, centering device and yoke clamp. Connect same as original.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | PHILCO PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T4 | 5200Ω | 3-4Ω | 32-5742-2 | Z1000 | A-3026 | AU-601 | A-3877 | 34S51 | S-6X | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | PHILCO PART No | QUAM PART No | |
| SP1 | 4" x 6" | PM | 3-4Ω | 36-1676-4 ①<br>36-1671-3 ②<br>36-1651-34 ③ | 46A1 | ① Used in Models G4242L, M, UG4242L, M<br>② Used in earlier versions of Models G4242L, M, UG4242L, M<br>③ Used in Models G4654M, W, UG4654M, W |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | PHILCO PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K1 | Vert. Retrace | 2000mmf, 5000mmf, 10K, 1meg | 30-6034-1 | Centralab<br>Sprague | PC-336<br>RS-2 |
| K2 | Sync Coupling | 180mmf, 2200mmf, 8000mmf, 18K, 680K, 2.2meg | 30-6518-2 | | |
| K3 | Vert. Integrator | 150mmf, 4000mmf, 5000mmf, 10K, 33K, 90K | 30-6030-7 ① | | |
| K4 | Vert. Feedback | 1500mmf, 2200mmf, 33K, 150K | 30-6509-2 | | |
| K5 | Horiz. AFC | 82mmf, 820mmf, 3900mmf, 150K, 880K, 1meg | 30-6034-1 | Sprague | C-6 |
| K6 | Horiz. Mult. Output | 330mmf, 1000mmf, 1200mmf, 3300mmf, 4700Ω, 3900Ω, 47K | 30-6512-6 | | |
| K7 | Picture Tube Isolation | 5000mmf, .2-1meg | 30-6026-2 | Centralab<br>Sprague | RC-471<br>ACI-4 |

① Chassis Runs 1 and 2 use alternate Part #30-6030-6 with values of 180mmf, 4000mmf, 5000mmf, 10K, 39K, and 90K.

## RECTIFIERS

| ITEM No. | RATING | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | PHILCO PART No. | FEDERAL PART No. | GENERAL ELECTRIC PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | |
| M1 | .270A | 34-8047-2 ① | RA504 ② | | SD-500 ③ | 40K ② | ① Germanium Type. Alternate Silicon Type Part #34-8048-1 |
| M2 | .270A | 34-8047-3 ① | RA504 ② | | SD-500 ③ | 40K ② | ② Silicon Type. |

## MISCELLANEOUS

| ITEM No. | PART NAME | PHILCO PART No. | NOTES |
|---|---|---|---|
| M3 | Lamp | 34-2064 | #44 |
| M4 | Lamp | | #1847 |
| M5 | Tuner | 76-11547-8 | (7-59G), VHF with UHF provisions, Ch. 9L37U |
| | Tuner | 76-11450-7 | (7-58G), VHF, Ch. 9L37 |
| | Tuner | 76-10391-1 | (7-27F), UHF, Ch. 9L37U |
| M7 | Switch | 42-3075-5 | Local-Distance, SPDT (Side Type) |
| | Printed Board | 54-5724-1 | Main |
| | Printed Board | 54-5529-1 | Video IF |

PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

FOLDER 1

# PARTS LIST AND DESCRIPTIONS (Continued)

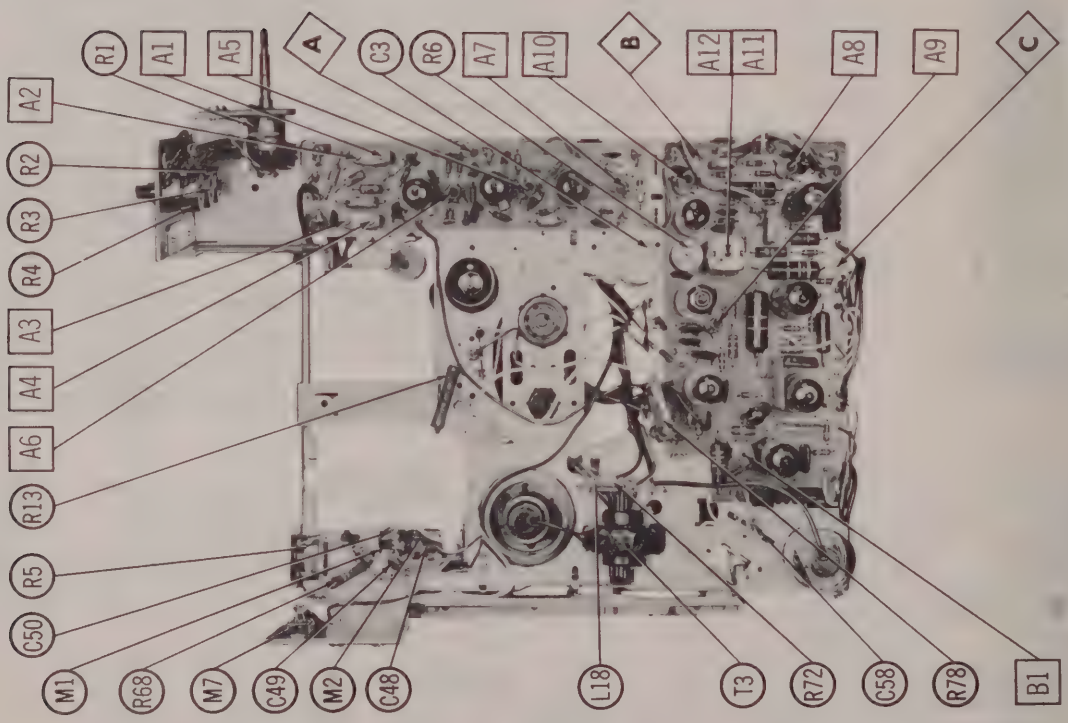
## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Safety Glass | 54-6691 | Includes Mask |
| Knob | 76-11142-8 | Channel Selector, Models G4242L, M |
| Knob | 76-11142-7 | Channel Selector, Models UG4242L, M |
| Knob | 76-11142-15 | Channel Selector, Models G4654M, W |
| Knob | 76-11142-16 | Channel Selector, Models UG4654M, W |
| Knob | 54-6307-1 | Fine Tuning |
| Knob | 76-10210-4 | UHF Models UG4242M, UG4654M |
| Knob | 76-10210-2 | UHF Models UG4242L, UG4654W |
| Knob | 54-6406-2 | Volume-On-Off, Models G4242L, M, UG4242L, M |
| Knob | 54-6406-3 | Volume-On-Off, Models G4654M, W, UG4654M, W |
| Knob | 54-6407-3 | Contrast, Models G4242L, M, UG4242L, M |
| Knob | 54-6407-4 | Contrast, Models G4654M, W, UG4654M, W |
| Knob | 54-6265-33 | Brightness, Models G4242M, UG4242M |
| Knob | 54-6265-36 | Brightness, Models G4242L, UG4242L |
| Knob | 54-6265-43 | Brightness, Vert. Hold, Horiz. Hold, Models G4654M, W, UG4654M, W |
| Knob | 54-6265-31 | Vert. Hold, Models G4242M, UG4242M |
| Knob | 54-6265-34 | Vert. Hold, Models G4242L, UG4242L |
| Knob | 54-6265-32 | Horiz. Hold, Models G4242M, UG4242M |
| Knob | 54-6265-35 | Horiz. Hold, Models G4242L, UG4242L |

## WIRING DATA

| | | |
|---|---|---|
| High Voltage Lead | Use BELDEN No. | 8869 |
| Shielded Hook-up Wire | Use BELDEN No. | 8885 (Single Conductor)<br>8738 (Two Conductor) |
| General-use Unshielded Hook-up Wire | Use BELDEN No. | 8530 (Solid) Available in Ten Colors<br>8524 (Stranded) Available in Ten Colors |
| Power Cord (Interlock Type) | Use BELDEN No. | 8874 |
| 300Ω Tuner Input Lead | Use BELDEN No. | 8225 |
| 300Ω Antenna Lead-in | Use BELDEN No. | 8230 or 8275 |
| Antenna Rotor Cable | Use BELDEN No. | 8464 (Flat) or 8484 (Round) - 4 Conductor<br>8485 (Round) - 5 Conductor<br>8488 (Round) - 8 Conductor |




CHASSIS-TOP VIEW

# TUNER ALIGNMENT INSTRUCTIONS (cont)

**UHF IF ALIGNMENT**

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | 1500mmf Ceramic Capacitor | High side to point ⓥ. Low side to chassis. | Not used | 43.5MC (400∿ 30% AM Mod) | UHF | Vert. Amp. thru 10K to point ⓤ. Low side to chassis. | A221 | Adjust for flat symmetrical response. |

**UHF TUNER ALIGNMENT**

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

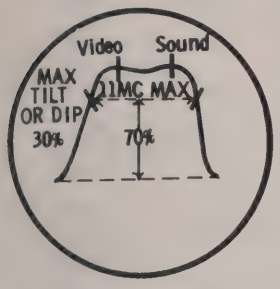
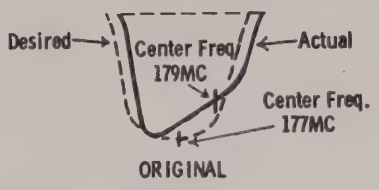



FIG.201



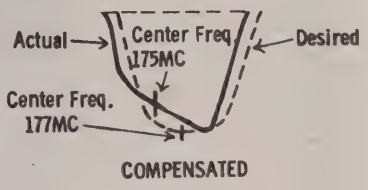




FIG.202

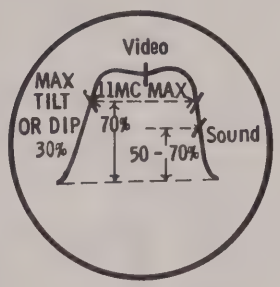
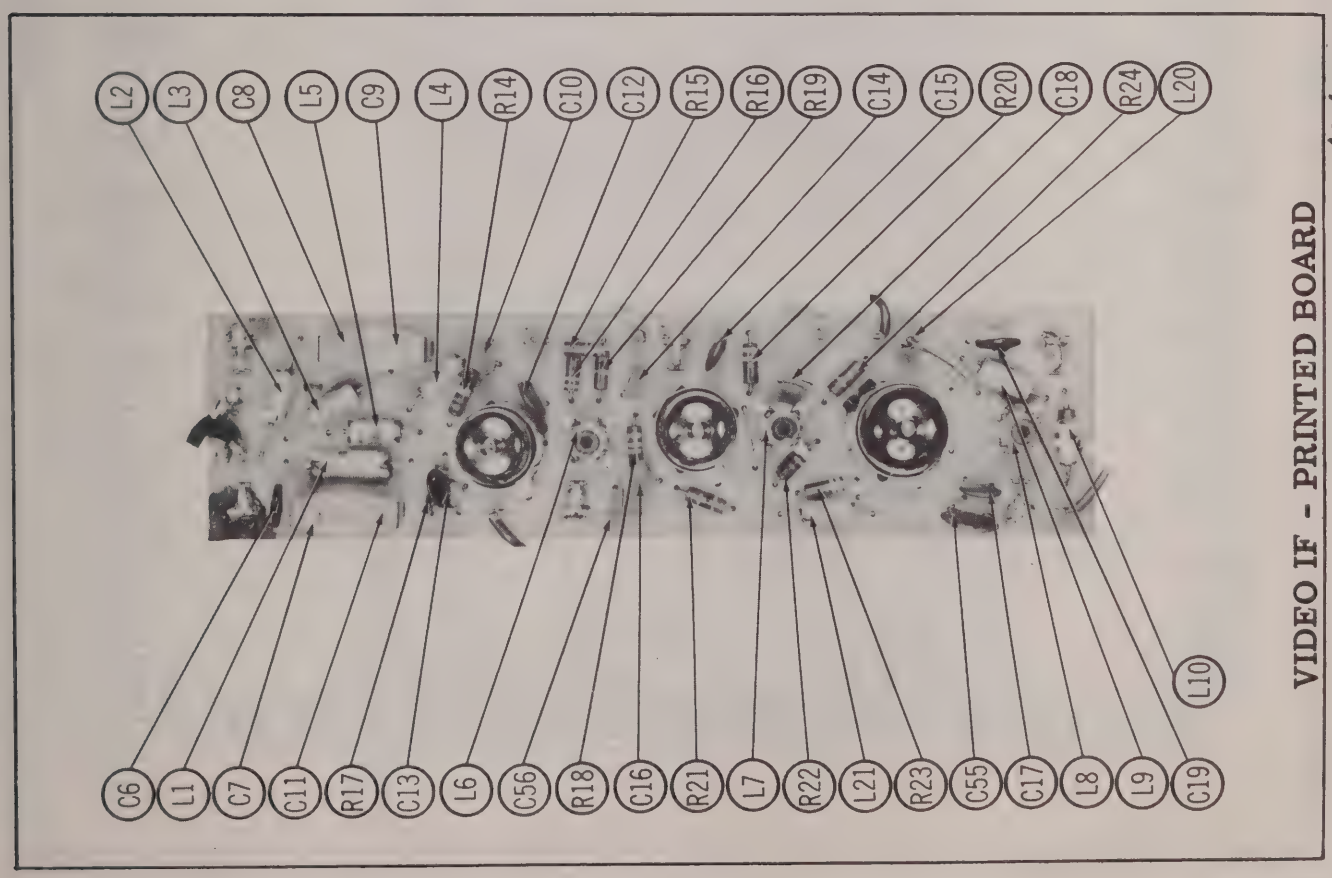
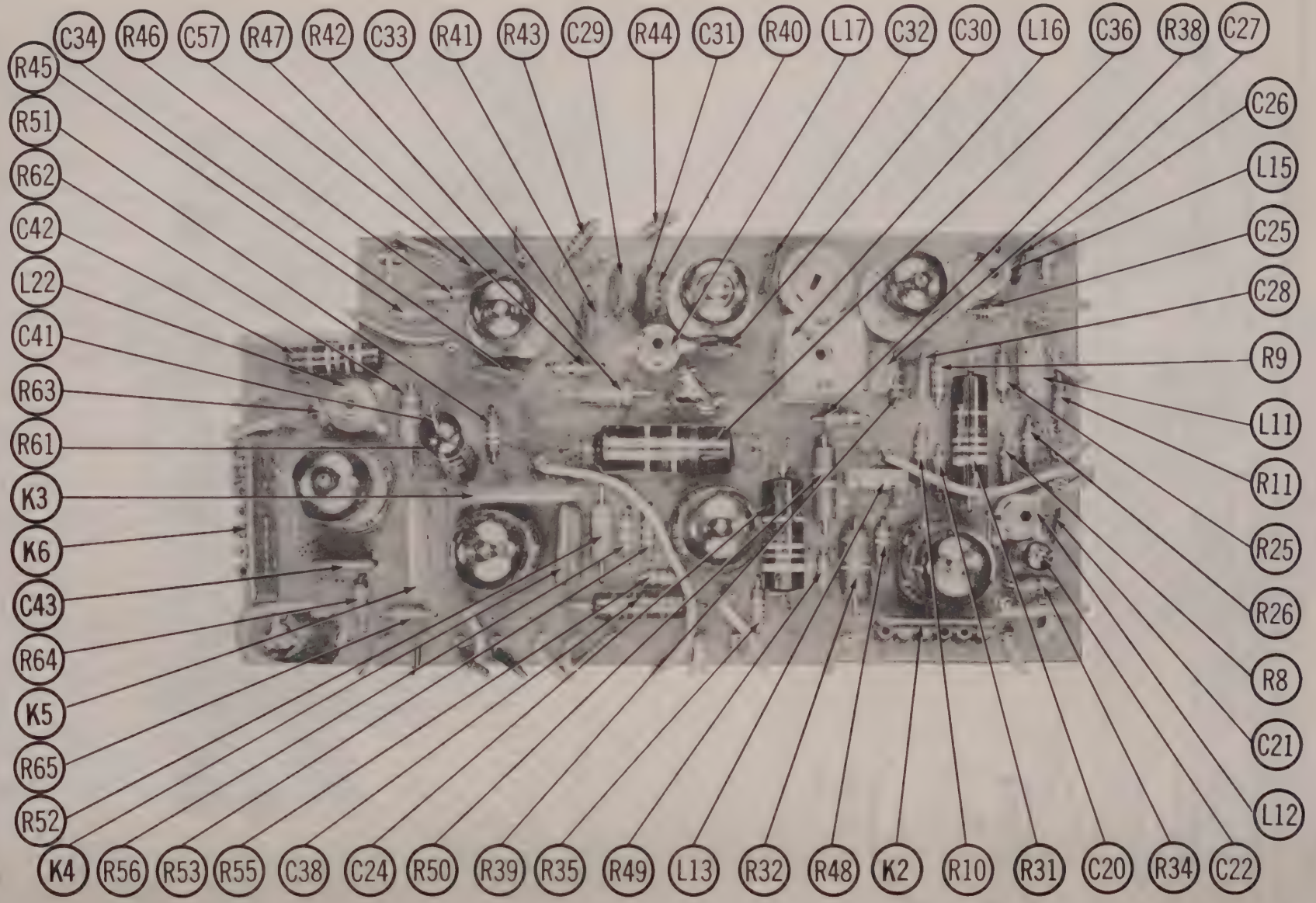


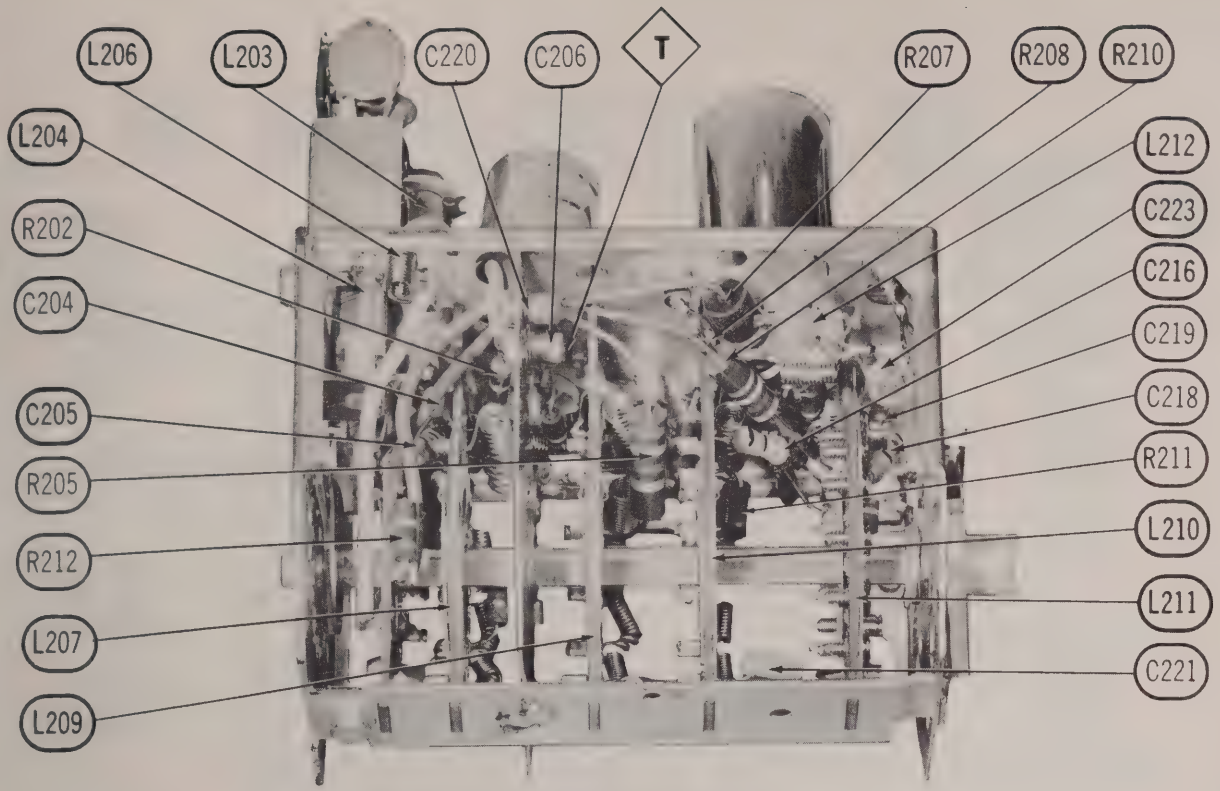

FIG. 203



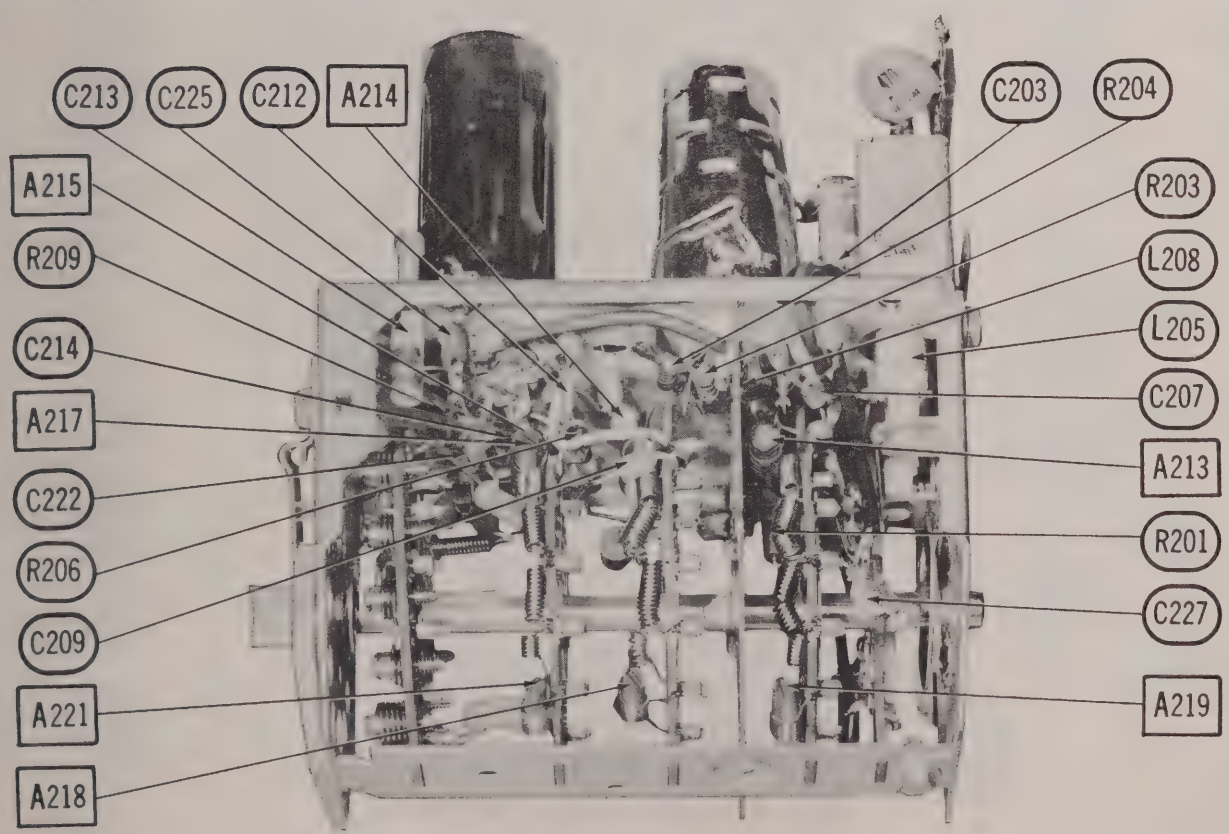

VIDEO IF - PRINTED BOARD



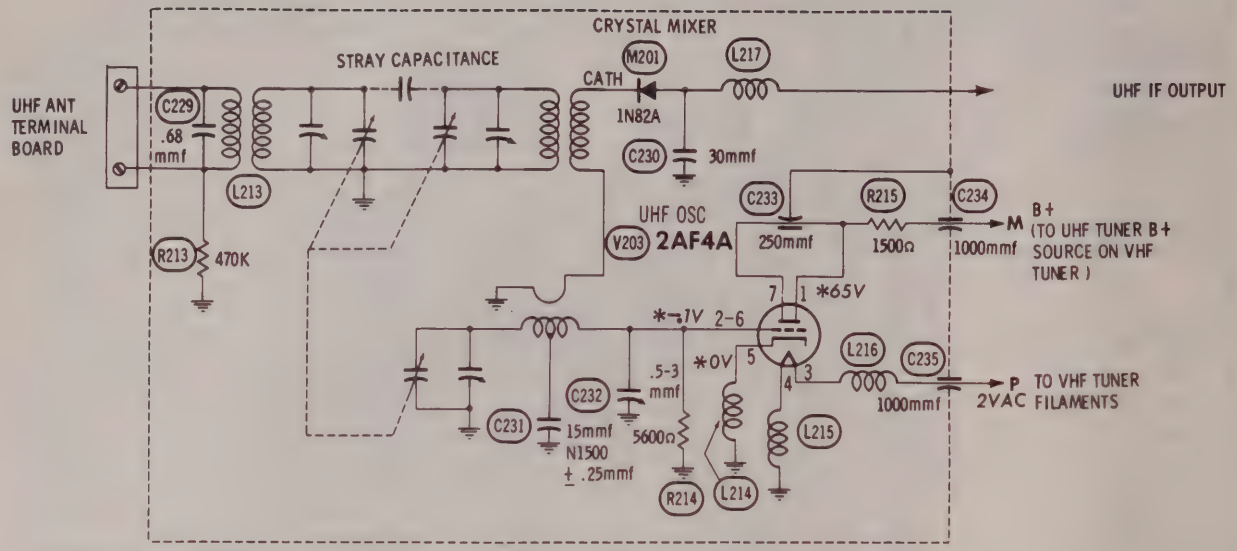

MAIN PRINTED BOARD




TUNER 76-11547-8 - LEFT SIDE




TUNER 76-11547-8 - RIGHT SIDE

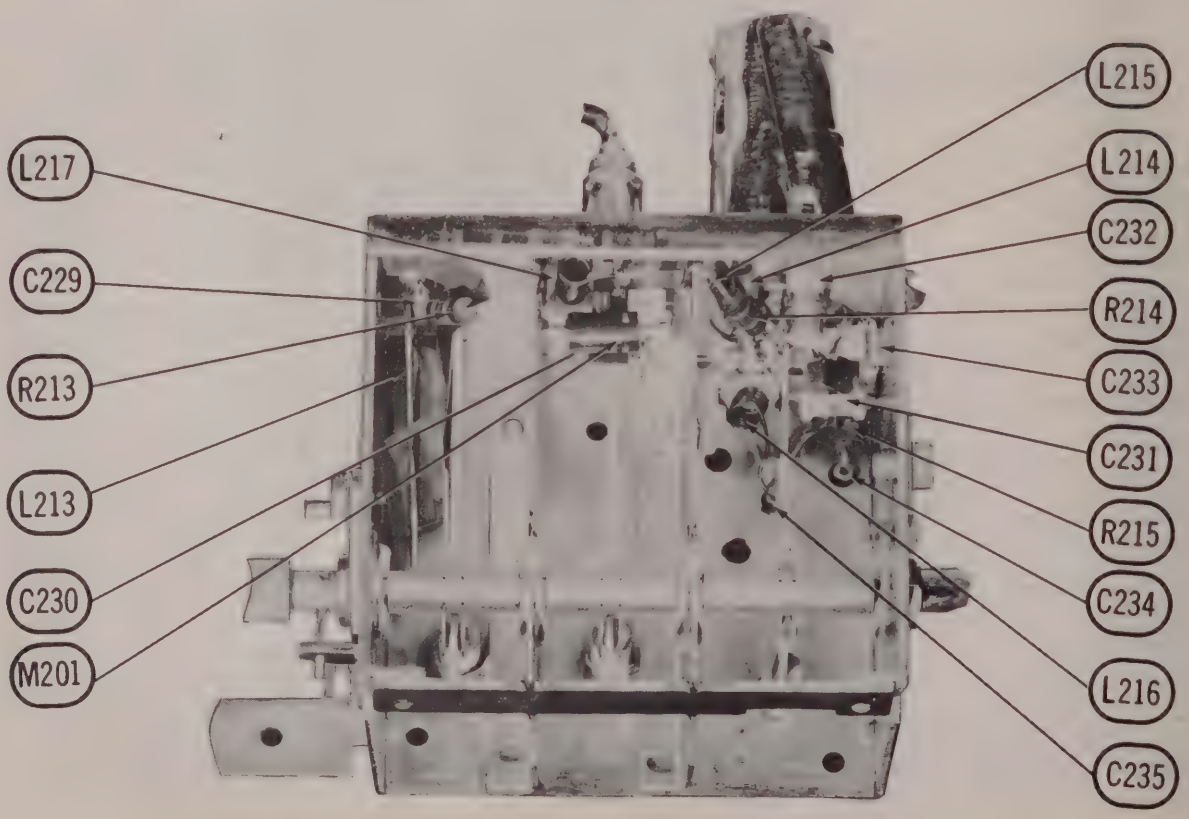



* MEASURED IN UHF POSITION.

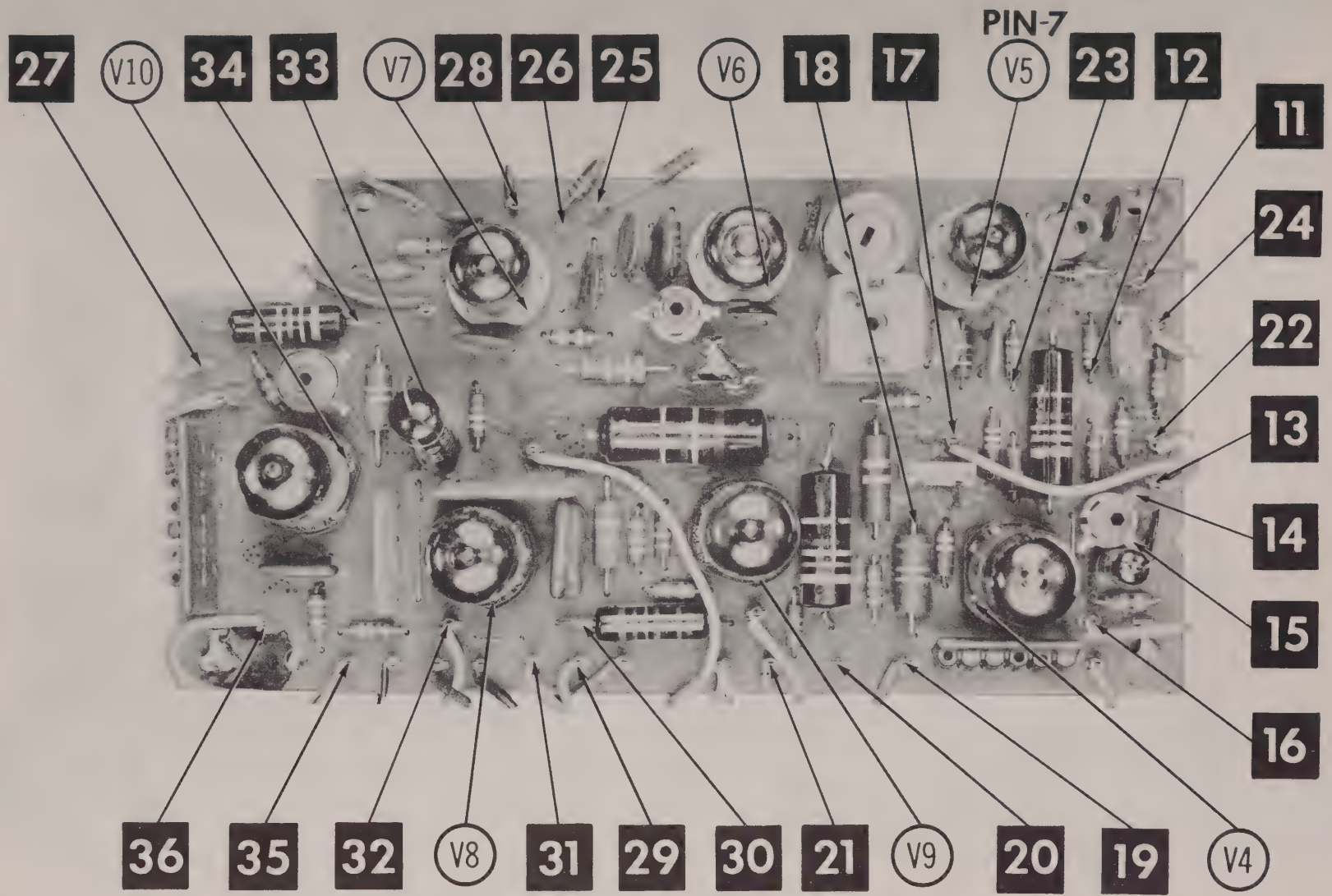
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

## UHF TUNER 76-10391-1 (T-27F)




## TUNER 76-10391-1




A Howard W. Sams CIRCUITRACE* Photo

MAIN PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PHILCO MODELS G4242L, M, G4654L, M, W, UG4242L, M, UG4654L, M, W (Ch. 9L37, U)

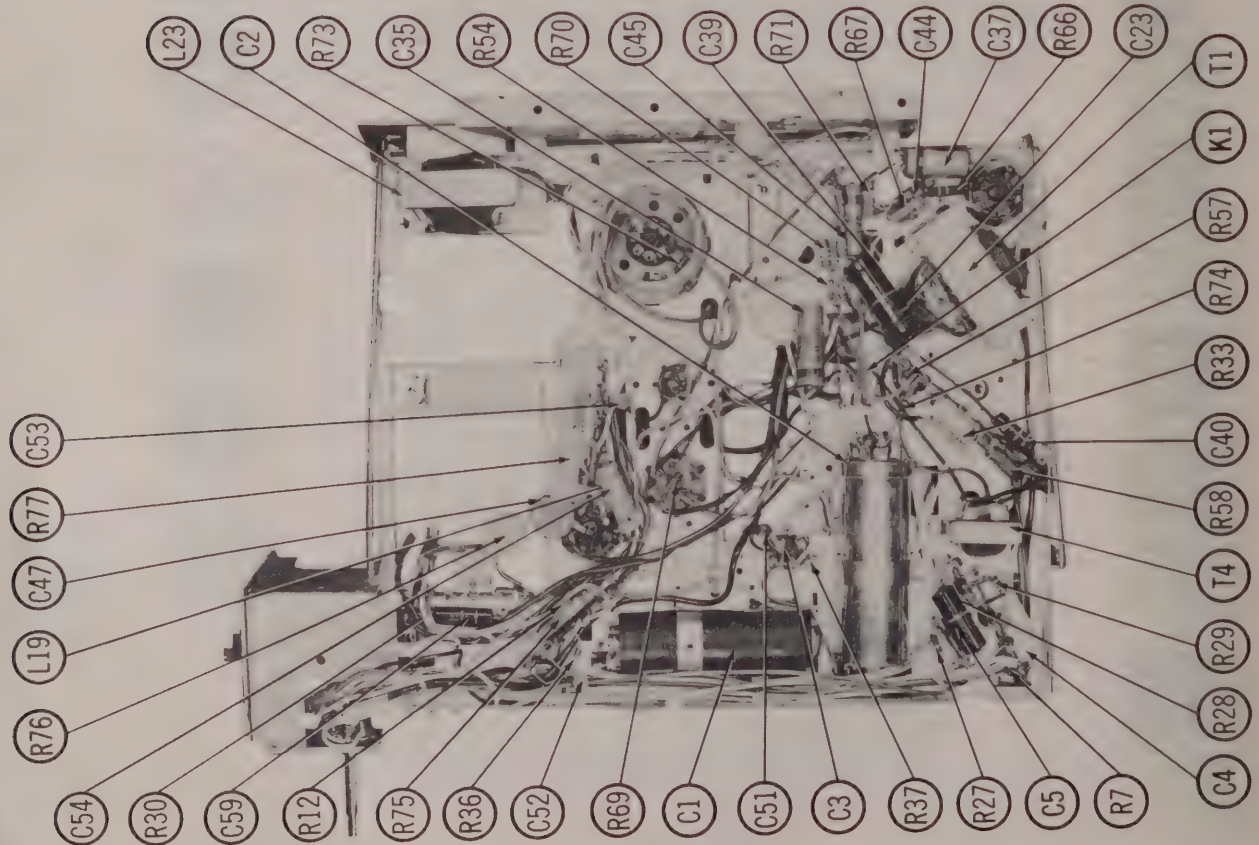
FOLDER 1

# RESISTANCE MEASUREMENTS

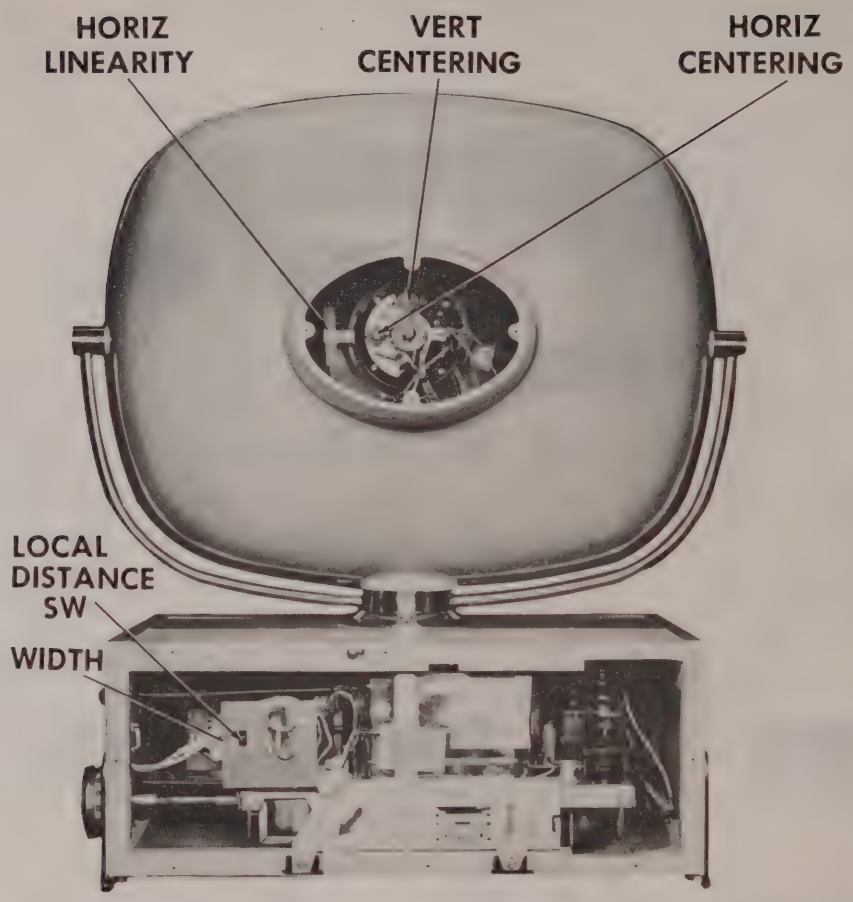
| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 3BZ6 | 1.5meg | 47Ω | 14Ω | 15Ω | ††330Ω | ††330Ω | 0Ω | | |
| V2 | 3BZ6 | 1.5meg | 68Ω | 15Ω | 16Ω | ††330Ω | ††330Ω | 0Ω | | |
| V3 | 5AM8 | 220Ω | .1Ω | ††800Ω | 16Ω | 17Ω | ††800Ω | .2Ω | 3900Ω | 0Ω |
| V4 | 6AW8A | 3300Ω | 4.8meg | †27K | 8.5Ω | 10Ω | 69Ω | 680K | ††0Ω | †5400Ω |
| V5 | 3AU6 | 4Ω | 0Ω | 10Ω | 11Ω | ††8200Ω | ††8200Ω | 180Ω | | |
| V6 | 3BN6 | • 230Ω | 3.3Ω | 11Ω | 12Ω | ††3900Ω | 3.4Ω | †300K | | |
| V7 | 12CA5 | ††68Ω | 480K | 12Ω | 14Ω | 480K | †1000Ω | †295Ω | | |
| V8 | 9BR7 | 40K | 3.5meg | 0Ω | 6.5Ω | 6.5Ω | 0Ω | 830K | 150K | 5Ω |
| V9 | 10DE7 | †430Ω | 2.3meg | 2.3meg | 8.5Ω | 6.5Ω | • †4.2meg | 150K | •23K | •600Ω |
| V10 | 6CG7 | †16K | 1.8meg | 1000Ω | 4Ω | 5Ω | †53K | • 100K | 1000Ω | NC |
| V11 | 12DQ6A | NC | 22Ω | NC | • †9000Ω | 1meg | TP | 20Ω | 0Ω | TOP CAP †28.7Ω |
| V12 | 12D4GT | NC | NC | ¶200K | NC | †1.7Ω | NC | 20Ω | 17Ω | |
| V13 | 1G3GT 1B3GT | PINS 1 THRU 8 HAVE INFINITE RESISTANCE | | | | | | | | TOP CAP †415Ω |
| V14 | 21EAP4 SF-21A | 4Ω | †150K | 1meg | 0Ω | NC | †150K | • 250K | 3.5Ω | |
| V201 | 4BC8 | †2800Ω | 250K | INF | 2Ω | 3.5Ω | INF | 1.5meg | 0Ω | 0Ω |
| V202 | 5X8 | 0Ω | 10K | †83K | 2Ω | .5Ω | 0Ω | 100K | †63K | †48K |
| V203 | 2AF4A | • †14K | 5600Ω | .5Ω | 0Ω | 0Ω | 5600Ω | •†14K | | |
| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
■ THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
• MEASURED IN "UHF" POSITION.
† MEASURED FROM 280V SOURCE.
†† MEASURED FROM 140V SOURCE.
ǂ MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION.
TP TIE POINT




CHASSIS-BOTTOM VIEW




## CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools:
GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

Turn the set on and tune in a station signal. Allow the receiver to warm up. Connect a clip lead across the Horizontal Frequency coil (L22).

Set the Horizontal Hold to the center of its range.

Adjust the Horizontal Range (R4B) until the picture appears to float back and forth across the screen.

Remove the clip lead from across L22 and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally.

Adjust the Width control (R5) for a picture slightly wider than necessary to fill the picture mask horizontally.

## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 front and 4 side push-on type knobs.
2. Remove 8 wood screws holding rear cover. Remove the rear cover.
3. Extend antenna rod outward.
4. Remove 2 metal screws holding chassis at the rear.
5. Partially remove chassis. Remove yoke and picture tube plugs and cathode lead, speaker, and HV leads.
6. Remove chassis.

PICTURE TUBE HOUSING DISASSEMBLY

1. Yoke is accessible by removing 4 metal screws holding rear cover to housing.
2. Remove 2 small metal screws holding bottom metal trim strip.
3. Remove spring holding wrap around plastic trim strip at the bottom. Remove plastic trim strip.
4. Remove 2 metal screws holding plastic shell strap at the bottom. Remove strap.
5. Remove front mask.
6. Remove snap-in metal trim caps on side support arms.
7. Remove 2 metal screws holding support arms to rear shell. Remove support arms by turning to line up bottom slots.
8. Remove 2 small metal screws holding rear shell to bottom support bracket.
9. Remove rear shell.

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# TRAV-LER MODELS
# 1465, 1466 (Ch. 945-18)

## IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

TRAV-LER MODELS
1465, 1466 (Ch. 945-18)

MODEL 1466 (Ch. 945-18)

TRAV-LER MODELS
1465, 1466 (Ch. 945-18)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

DATE 4–59 SET 439 FOLDER 2

SET 439 FOLDER 2

PHOTOFACT* Folder

*TRADE MARK

EIA ELECTRONIC INDUSTRIES ASSOCIATION MEMBER

**TRAV-LER MODELS**
**1465, 1466 (Ch. 945-18)**

TRAV-LER MODELS
1465, 1466 (Ch. 945-18)

# DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs.
2. Remove 6 metal screws, 2 antenna leads and rear cover.
3. Remove picture tube socket, Ion trap, HV and speaker leads.
4. Remove 2 metal screws holding speaker and remove speaker.
5. Remove 2 metal screws holding AC interlock bracket.
6. Remove 2 chassis bolts from bottom.
7. Remove 1 top chassis bolt (middle one in handle).
8. Remove chassis.

MODEL 1466 (Ch. 945-18)

**CAUTION**

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRAV-LER MODELS
1465, 1466 (Ch. 945-18)

| TRADE NAME | Trav-Ler | MODELS | CHASSIS |
|---|---|---|---|
| | | 1465, 1466 ..... | 945-18 |
| MANUFACTURER | Trav-Ler Radio & Tele. Corp., 571 West Jackson Blvd., Chicago 6, Illinois | | |
| TYPE SET | Television Receiver | | |
| TUBES | Thirteen | | |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle | RATING 115 Watts, 1.14 Amp. @ 117 Volts AC | |
| TUNING RANGE | Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs. The High band adjustments may be made with the slug located near the right side, and the Low band by slug near the bottom of the tuner. Adjust from highest to lowest channel.

SAFETY GLASS REMOVAL

Remove the front handle mounting screw. Remove 2 metal screws on the bottom, holding the front. Remove the front of the cabinet. Remove the clamps holding the safety glass, and remove the glass.

FOCUS

Focus may be varied by placement of a strap on the picture tube base between pins 6 and 2 or 6 and 10. Readjust Ion trap for best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

To adjust the Horizontal Multivibrator, remove the rear cover and supply power to the set. Set the Horizontal Hold control at mid-position and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally.

FUSES

A 4.7Ω fusible resistor (R68) is used for LV power supply protection.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

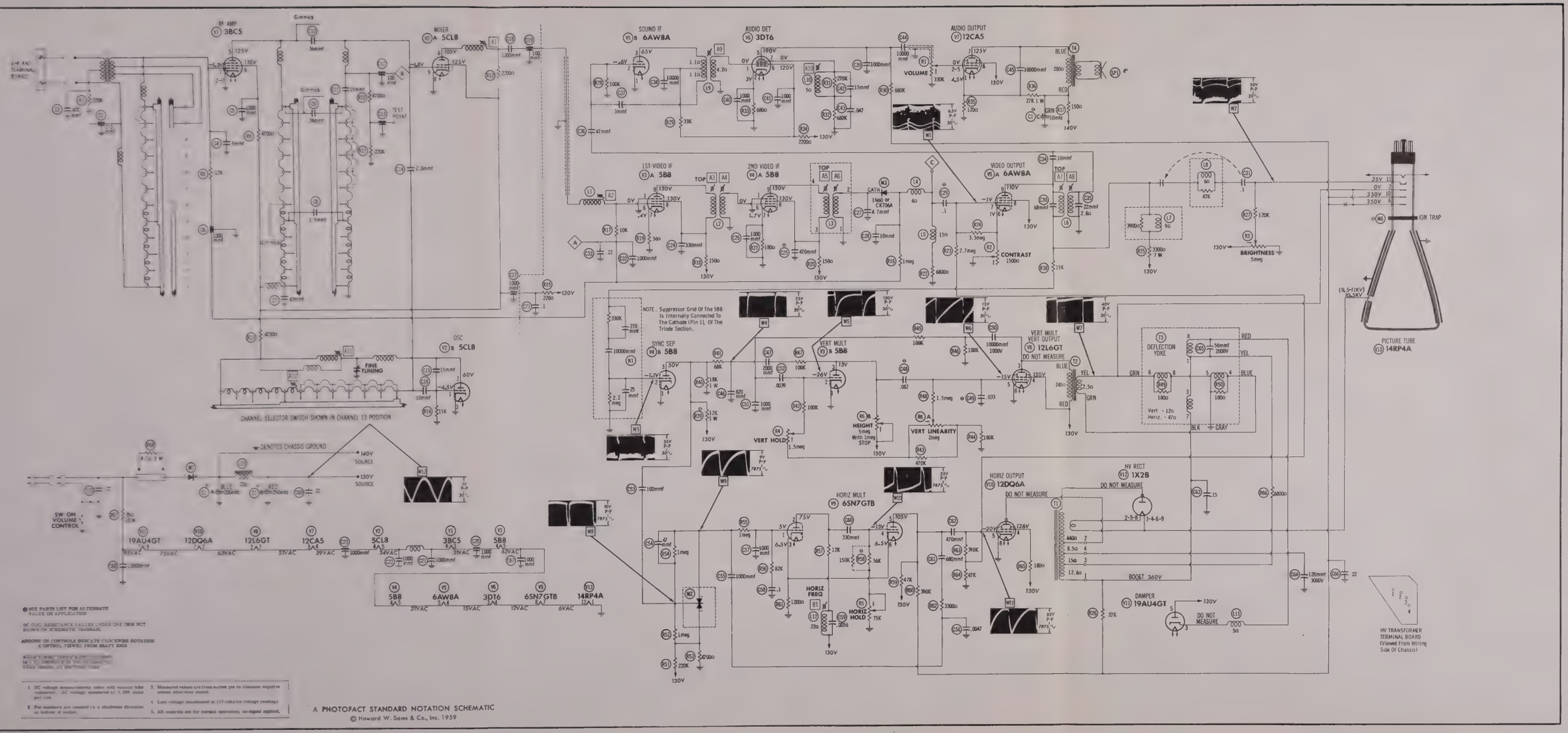
**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

G952R

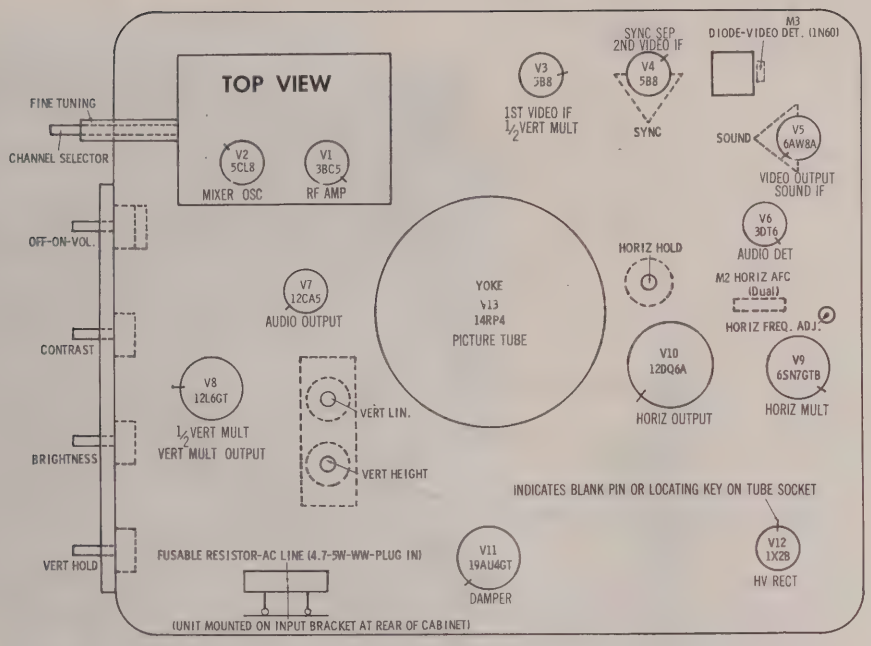
DATE 4-59 SET 439 FOLDER 2

SET 439 FOLDER 2




TRAV-LER MODELS 1465, 1466 (Ch. 945-18)

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

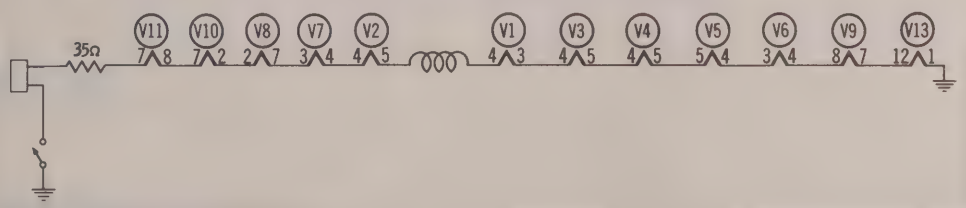
POWER SUPPLY FAILURE
No raster, no sound - **Fusible Resistor (R68), Rectifier (M1)**

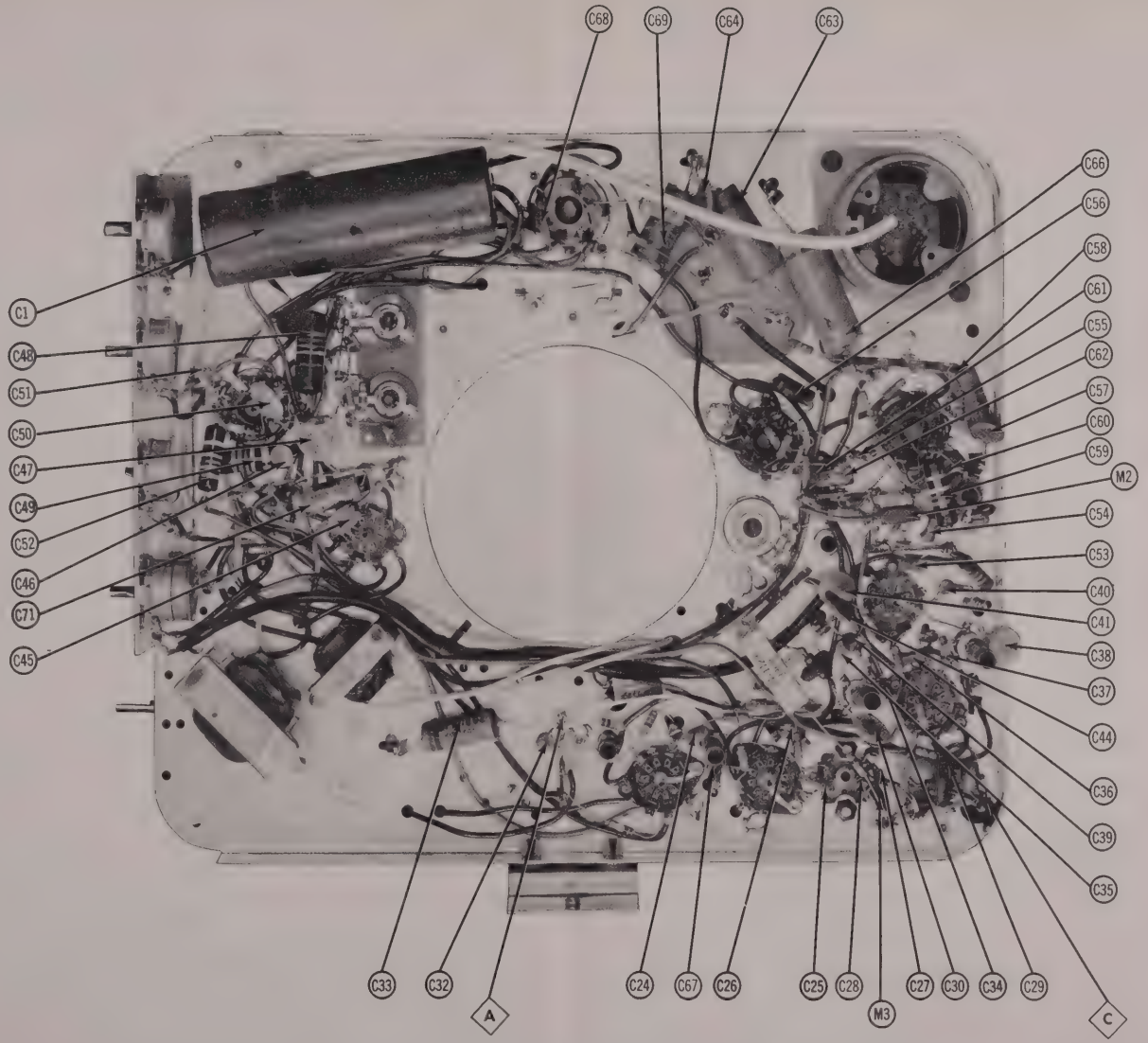
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, Diode (M3), V5**
No pic, no sound, has snow - **V1, V2**
No pic, has sound, has raster - **V5, V13**
Has pic, no sound - **V5, V6, V7**

SYNC FAILURE
No vert. sync - **V3, V4, V8**
No horiz. sync - **V4, Diode (M2), V9**
No vert. or horiz. sync - **V4**

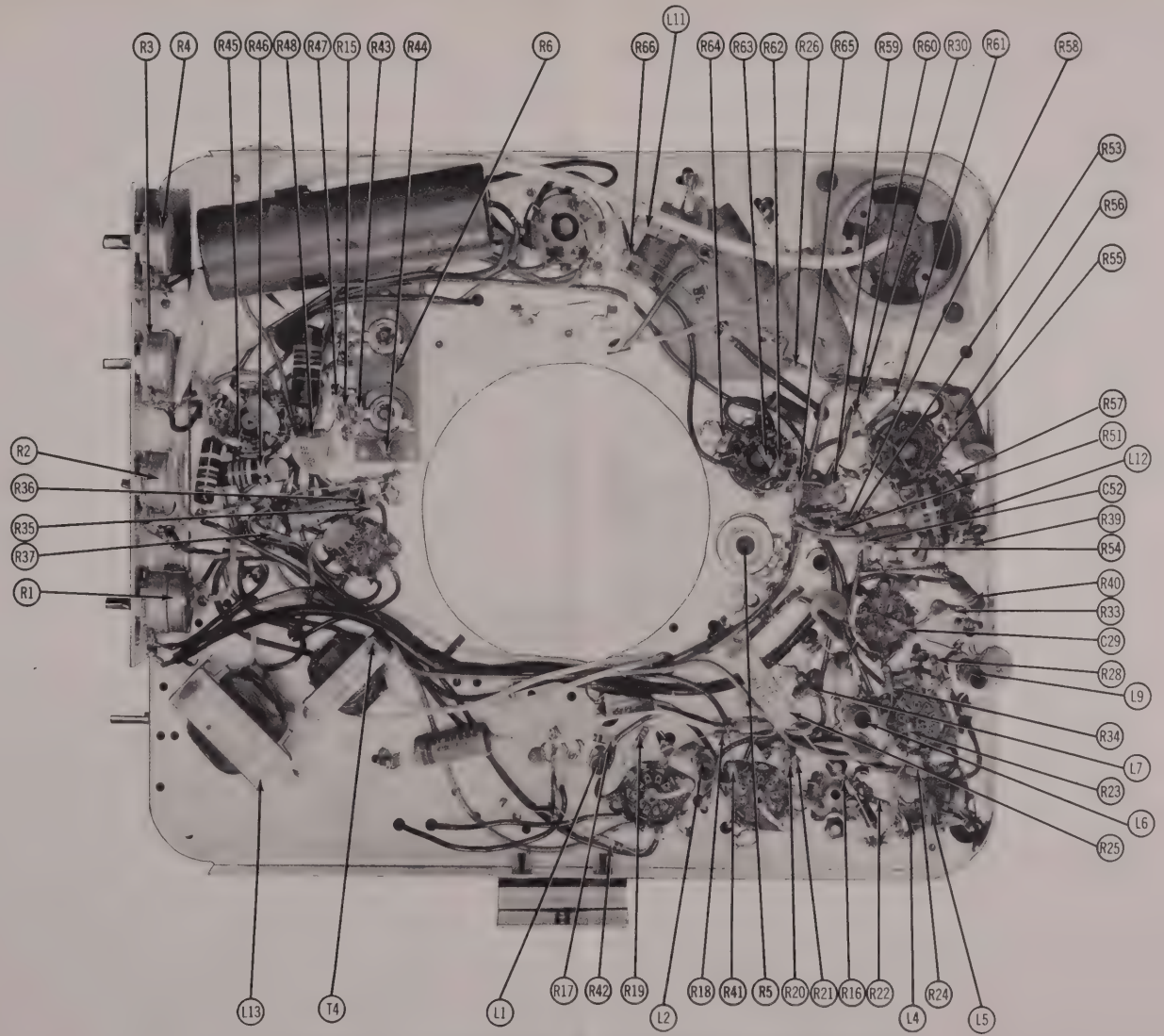
SWEEP FAILURE
No raster, has sound - **M2, V9, V10, V11, V12, V13**
No vertical deflection - **V3, V8**
Poor vert. linearity or foldover - **V3, V8**
Poor horiz. linearity or foldover - **V9, V10, V11**
Narrow picture - **V9, V10, V11, M1**
Vert. off freq. - **V3, V4, V8**
Horiz. off freq. - **V4, M2, V9**

**Since this receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below.)**






CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis.

**VIDEO IF ALIGNMENT**

Connect the negative lead of a 3 volt bias battery to point (A). Positive to chassis.
Disable oscillator by replacing Mixer-Osc. tube 5CL8 (V2) with a 5CL8 with pin 1 removed.
Short the antenna terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | 1000MMF ceramic capacitor | High side to point (B). Low side to chassis. | 44.0MC (10MC Swp) | 42.75MC 45.75MC | Any channel. | Vert. amp. thru detector (Fig. 1) to plate, pin 9 of 5B8 (V3). Low side to chassis. | A1, A2 | Adjust for response similar to Fig. 2 with markers in proper positions. |
| 2. | " | High side to pin 6 (grid) of 5B8 (V3). Low side to chassis. | " | " | " | Vert. amp. thru detector (Fig. 1) to plate, pin 9 of 5B8 (V4). Low side to chassis. | A3, A4 | " |
| 3. | " | High side to pin 6 (grid) of 5B8 (V4). Low side to chassis. | " | " | " | Vert. amp. to point (C). Low side to chassis. | A5, A6 | " |
| 4. | " | High side to point B. Low side to chassis. | " | " | " | " | | Retouch A1 thru A6 as needed to correct for curve similar to Fig. 3. Remove bias and replace 5CL8 (V2). |

**SOUND IF ALIGNMENT**

Set the contrast control fully clockwise. Set volume control at midrange.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | 1000MMF ceramic capacitor | High side to point (C). Low side to chassis. | Not used. | 4.5MC (400% 30% AM Mod) | Any non-interfering channel. | Vert. amp. thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Low side to chassis. | A7, A8 | Turn A7 fully counter clockwise. Turn A8 fully clockwise. Turn A7 clockwise for MINIMUM 400% indication on scope. |
| 6. | " | " | 4.5MC (15KC Swp) | Not used. | " | Across secondary of output transformer. | A8, A9, A10 | Use only enough sweep generator output to provide usable pattern on scope. Turn A10 fully counter clockwise. Adjust A8, A9 and A10 for maximum indication on scope. Remove test equipment and tune in a TV station. Retouch A10 for MINIMUM buzz. |

**OSCILLATOR ALIGNMENT**

Turn the set on and tune in the highest high band channel (7-13) operating in the area and adjust A11 for clearest picture and best sound. A11 is located below and to the right of the tuning shaft. Switch the channel selector to the highest low band channel (2-6) operating in the area and adjust A12 for clearest sound and best picture. A12 is located directly to the left of the tuner shaft.

**RF AND MIXER ALIGNMENT**

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

FIG. 1

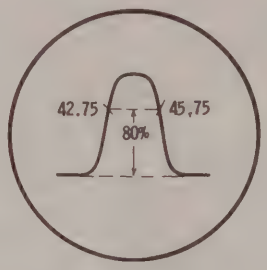


FIG. 2

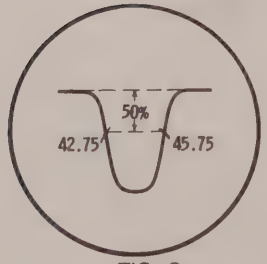


FIG. 3

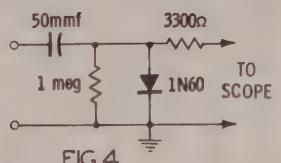


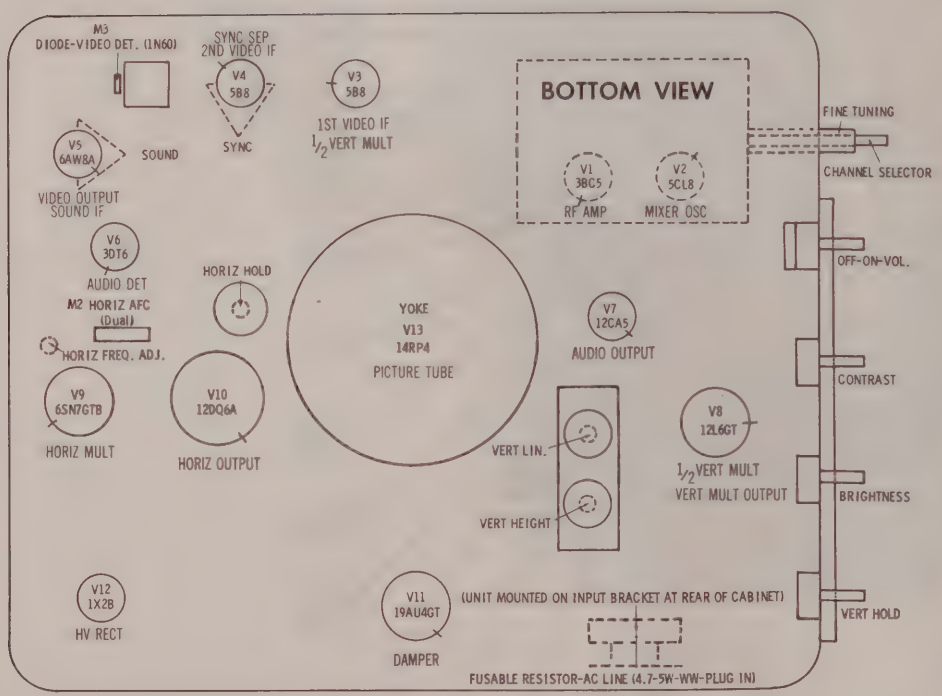
FIG. 4

CHASSIS TOP VIEW

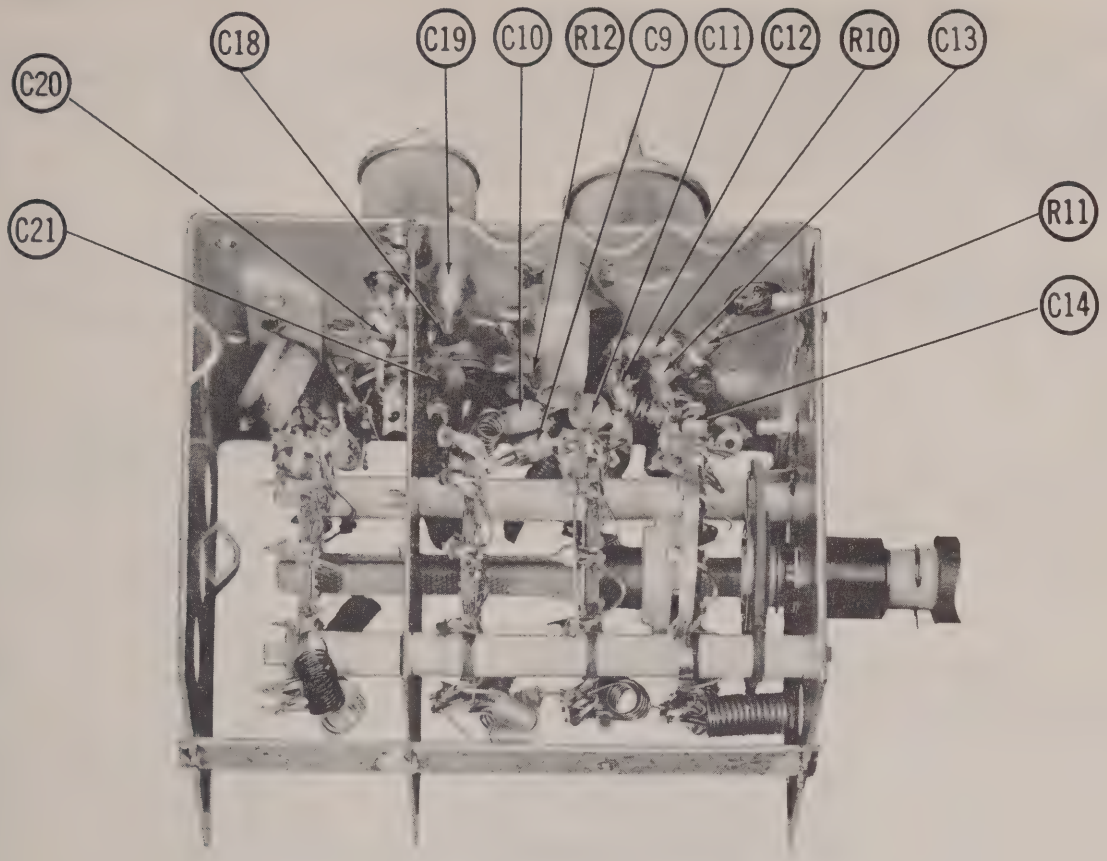
# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 3BC5 | 1Meg | 0Ω | 6.5Ω | 7Ω | †240Ω | †5000Ω | 0Ω | | |
| V2 | 5CL8 | 15K | †5000Ω | 0Ω | 7.5Ω | 7Ω | †2400Ω | †240Ω | 0Ω | 220K |
| V3 | 5B8 | 0Ω | •1.3Meg | •†2.7Meg | 6.5Ω | 6.5Ω | 1Meg | 56Ω | †170Ω | †170Ω |
| V4 | 5B8 | 0Ω | 2.2Meg | †12K | 5.5Ω | 5Ω | 0Ω | 180Ω | †170Ω | †170Ω |
| V5 | 6AW8A | 0Ω | 100K | †35K | 3.5Ω | 5Ω | • 10Ω | 1.4Meg | †22Ω | †3300Ω |
| V6 | 3DT6 | 4.2Ω | 680Ω | †3.5Ω | 3Ω | ‡700K | †2200Ω | 680K | | |
| V7 | 12CA5 | 120Ω | 270K | 9Ω | 7.5Ω | 270K | †22Ω | †430Ω | | |
| V8 | 12L6GTB | TP | 10.5Ω | †260Ω | †22Ω | •2.3Meg | TP | 9Ω | 0Ω | |
| V9 | 6SN7GTB | 1.8Meg | †12K | 1200Ω | •75K | †47K | 1200Ω | 1.5Ω | 3Ω | |
| V10 | 12DQ6A | TP | 10.5Ω | TP | †200Ω | 440K | TP | 11.5Ω | 0Ω | TOP CAP ‡13Ω |
| V11 | 19AU4GT | NC | TP | 480K | NC | †22Ω | TP | 13Ω | 11.5Ω | |
| V12 | 1X2B | PINS 1 THRU 9 HAVE INFINITE RESISTANCE | | | | | | | | TOP CAP ‡453Ω |
| V13 | 14RP4 | 0Ω | 3Ω | Pin 6 ‡27K | Pin 10 ‡27K | Pin 11 •†120K | Pin 12 1.5Ω | | | |

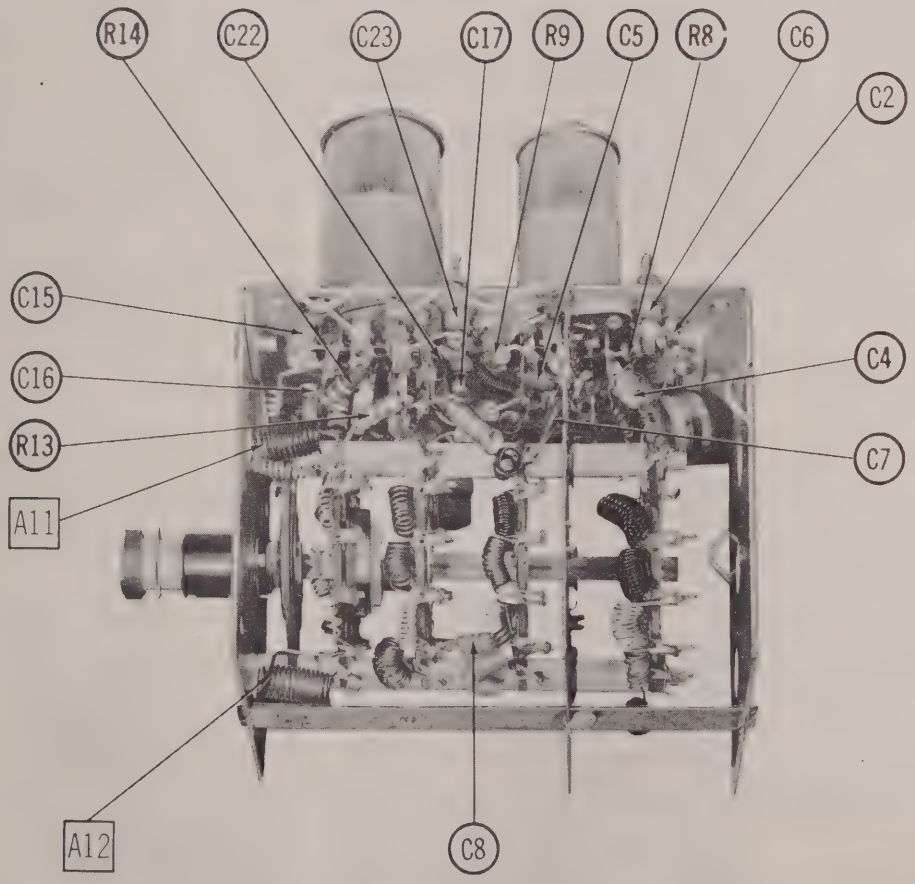
† MEASURED FROM OUTPUT OF M1.
‡ MEASURED FROM PIN 3 OF V11.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
NC NO CONNECTION
TP TIE POINT




# TUBE PLACEMENT CHART




RF TUNER-LEFT SIDE




RF TUNER-RIGHT SIDE

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amp | 3BC5 | |
| V2 | Mixer-Osc | 5CL8 | |
| V3 | 1st Video IF - Vert. Mult. | 5B8 | |
| V4 | 2nd Video IF - Sync Sep. | 5B8 | |
| V5 | Video Output - Sound IF | 6AW8A | |
| V6 | Audio Det. | 3DT6 | |
| V7 | Audio Output | 12CA5 | |
| V8 | Vert. Mult. - Vert. Output | 12L6GT | |
| V9 | Horiz Mult. | 6SN7GTB | |
| V10 | Horiz Output | 12DQ6A | |
| V11 | Damper | 19AU4GT | |
| V12 | HV Rect. | 1X2B | |

## PICTURE TUBE

| ITEM No | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|
| | TRAV-LER PART No | GENERAL ELECTRIC PART No | RCA PART No. | SYLVANIA PART No. | |
| V13 | 14RP4A | 14RP4A ① 14RP4 | 14RP4-A ② | 14RP4A ③ | ① Aluminized ② "Silverama ®" ③ Silver Screen "85" |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TRAV-LER PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1A | 200 | 150 | EC-79 | PR3-012 | [illegible] | WT320 | CDBT-1015 | TVA-3460 | |
| B | 250 | 150 | | | | | | | |
| C | 10 | 150 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No | RATING | | TOL | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | | TRAV-LER PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | | |
| C2 | 2.0 | | | | BPD-00047 | DD-47L | BYA10T47 | UC-5347 | 5GA-T47 | | |
| C3 | 470 | | | | NPO-SI 5 | TCZ-4R7 | C10V5C | ZT-5547 | 5TCCB-V5 | | |
| C4 | 8 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C5 | 1000 | | | | EF-001 | MFT-1000 | | | 503C-DI | | |
| C6 | 1000 | | | | BPD-000047 | DD-470 | L10Q47 | UC-5447 | 5GA-Q47 | | |
| C7 | 47 | | | | NPO-SI 1.5 | TCZ-1R5 | C10V15C | ZT-5615 | 5TCCB-V15 | | |
| C8 | 1.5 | | | | | | | | | | |
| C9 | .24 | | | | | | | | | | |
| C10 | .36 | | | | | | | | | | |
| C11 | 15 | | | | BPD-00001S | DD-150 | L10Q15 | UC-5415 | 5GA-Q15 | | |
| C12 | | | | | | | | | | | |
| C13 | 100 | | | | | | | | | | |
| C14 | 2.0 | | | | NPO-SI 2.2 | TCZ-2.2 | C10V2C | | | | |
| C15 | 15 | | N3000 | | | | | | | | |
| C16 | 10 | | | | NPO-SI 10 | TCZ-10 | C10Q1C | ZT-541 | 5TCC-Q1 | | |
| C17 | 1000 | | | | EF-001 | MFT-1000 | | | 503C-DI | | |
| C18 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C19 | 100 | | | | | | | | | | |
| C20 | 1000 | | | | EF-001 | MFT-1000 | | | 503C-DI | | |
| C21 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C22 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C23 | 1000 | | | | EF-001 | MFT-1000 | | | 503C-DI | | |
| C24 | 330 | | | | BPD-00033 | DD-331 | C10T33 | UC-5333 | 5GA-T33 | | |
| C25 | 470 | | | | BPD-00047 | DD-471 | BYA10T47 | UC-5347 | 5GA-T47 | | |
| C26 | 1000 | | | | BPD-001 | DQ-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C27 | 4.7 | | | | NPO-SI 4.7 | TCZ-4R7 | C10V47C | ZT-555 | 5TCCB-V47 | | |
| C28 | 10 | | | | SI 10 | DS-100 | LT5QI | UC-541 | 5GA-QI | | |
| C29 | .1 | 150 | | | P388N-1 | DF-104 | CUB2P1 | GEM-201 | 2TM-P1 | | ① |
| C30 | 68 | | N75 | | | | | | | | |
| C31 | .1 | 200 | | | P388N-1 | DF-104 | CUB2P1 | GEM-201 | 2TM-P1 | | |
| C32 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C33 | .22 | 100 | | | P388N-22 | | CUB2P22 | GEM-5022 | 2TM-P22 | | |
| C34 | 10 | | | | SI 10 | DS-100 | LT5QI | UC-541 | 5GA-QI | | |
| C35 | 22 | | N75 | | | | | | | | |
| C36 | 47 | | | | SI 47 | DS-470 | LT5Q47 | UC-5447 | 5GA-Q47 | | |
| C37 | 3 | | | CC-90 | SI 3 | DS-030 | LT5V3 | ZT-553 | | | |
| C38 | 10000 | | | | BPD-01 | DD-103 | BYA5SI | DC5II | 5HK-SI | | |
| C39 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C40 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C41 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C42 | 15 | | N080 | | | | | | | | |
| C43 | .047 | 200 | | | BPD-05 | DF-503 | CUB2S47 | GEM-2147 | 2TM-S47 | | |
| C44 | 10000 | | | | BPD-01 | DD-103 | BYA5SI | DC5II | 5HK-SI | | |
| C45 | 10000 | | | | BPD-01 | DD-103 | BYA5SI | DC5II | 5HK-SI | | |
| C46 | 820 | | | | BPD-0008 | DS-821 | L10T82 | | 5GA-T82 | | |
| C47 | 2000 | | | | BPD-002 | DD-202 | BYA10D2 | DC522 | 5HK-D2 | | |
| C48 | .082 | 200 | | PC-54 | | | | | | | |
| C49 | .033 | 200 | | PC-53 | P388N-033 | DF-303 | CUB2S33 | GEM-4133 | 2TM-S33 | | |
| C50 | 10000 | 1000 | | CC-45 | P1068N-01 | DD-103 | BYA10SIM | | 10HKB-SI | | |
| C51 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C52 | .0039 | 200 | | PC-56 | BPD-004 | DS-402 | CUB2D39 | GEM-624 | 5TM-D4 | | |
| C53 | 100 | | | | SI 100 | DS-101 | LT5TI | UC-531 | 5GA-T1 | | |
| C54 | 47 | | | | SI 47 | DS-470 | LT5Q47 | UC-5447 | 5GA-Q47 | | |
| C55 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C56 | .0047 | 200 | | | BPD-0047 | DS-472 | CUB2D47 | GEM-6247 | 5TM-D47 | | |
| C57 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C58 | .1 | 200 | | | P388N-1 | DF-104 | CUB2P1 | GEM-201 | 2TM-P1 | | |
| C59 | .0056 | 400 | | PC-56 | P468N-005 | DS-562 | CUB2D5 | GEM-425 | 5TM-D5 | | |
| C60 | 330 | | | | 1464-00033 | | BYW7T33 | | MS-333 | | |
| C61 | 680 | | | | 1464-00068 | | 1W5T68 | | MS-347 | | |
| C62 | 470 | | | | BPD-00047 | DD-471 | BYA10T47 | UC-5347 | 5GA-T47 | | |
| C63 | .18 | 600 | | | P468N-15 | | CUB5P15 | GEM-6015 | 5TM-P15 | | |
| C64 | 130 | 3000 | 10% | CC-87 | | DD30-131 | HVB30T13 | | 30GA-T13 | | |
| C65 | 56 | 3000 | 10% | CC-86 | | DD30-56 | HVA20Q56 | DC30456 | 20GA-Q56 | | |
| C66 | .22 | 600 | | PC-37C | P688N-22 | | CUB6P22 | GEM-6022 | 5TM-P22 | | |
| C67 | 1000 | | | | BPD-001 | DD-102 | BYA5DI | DC5JI | 5HK-DI | | |
| C68 | 10000 | | | | BPD-01 | DD-103 | BYA5SI | DC5II | 5HK-SI | | |
| C69 | .22 | 300 | | | P288N-22 | | CUB3P22 | GEM-3022 | 3TM-P22 | | |
| C70 | .22 | 600 | | | P688N-22 | | CUB6P22 | GEM-6022 | 5TM-P22 | | |
| C71 | .1 | 200 | | | P388N-1 | DF-104 | CUB2P1 | GEM-201 | 2TM-P1 | | |

① Some versions may use .047mfd ② 200V in this application.

## CONTROLS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | TRAV-LER PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 330K | ½ | VC-143 | B-60 | A47-500K-Z | Q13-133 | TA334A | Volume |
| B | Shaft | | | Not Req. | F8-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-1 or KR-1* | SWE-13 | 76-1 | U8-26 | |
| R2A | 1500Ω | ½ | VC-142 | B-518 | | Q17-109 | U8 | Contrast |
| B | Shaft | | | Not Req. | | Not Req. | Not Req. | |
| R3A | 5meg | ½ | VC-140 | | | Q17-141 | TA56R | Brightness |
| B | Shaft | | | | | Not Req. | Not Req. | |
| R4A | 1.5meg | ½ | VC-141 | B-742 | A47-1.5meg-S | Q11-138 | U18S | Vert. Hold |
| B | Shaft | | | Not Req. | F8-3 | Not Req. | Not Req. | |
| R5A | 75K | ½ | VC-144 | B-36 | A47-75K-S | Q11-135 | PTA15L | Horiz. Hold |
| B | Shaft | | | Not Req. | F8S-½ | Not Req. | Not Req. | |
| R6A | 2meg | ½ | VC-145 | | | | | Vert. Lin. |
| B | 5meg | ½ | | | | | | Height with 1meg stop |

* Use KB with CRL "blue label" controls, and KR with "red label" controls.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | TRAV-LER PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R7 | 220K | | | |
| R8 | 12K | | | |
| R9 | 4700Ω | | | |
| R10 | 4700Ω | | | |
| R11 | 220K | | | |
| R12 | 2200Ω | | | |
| R13 | 4700Ω | | | |
| R14 | 15K | | | |
| R15 | 220Ω | | | |
| R16 | 1meg | | | |
| R17 | 10K | | | |
| R18 | 150Ω | | | |
| R19 | 56Ω | | | |
| R20 | 150Ω | | | |
| R21 | 180Ω | | | |
| R22 | 6800Ω | | | |
| R23 | 2.7meg | | | |
| R24 | 3.3meg | | | |
| R25 | 3300Ω | ? | WR-40 | |
| R26 | 27K | | | |
| R27 | 120K | | | |
| R28 | 100K | | | |
| R29 | 33K | | | |
| R30 | 680K | | | |
| R31 | 270K | | | |
| R32 | 680K | | | |
| R33 | 680Ω | | | |
| R34 | 2200Ω | | | |
| R35 | 120Ω | | | |
| R36 | 27K | 1 | | |
| R37 | 150Ω | | | |

| ITEM No. | RATING | | TRAV-LER PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R38 | 15K | | | |
| R39 | 12K | 1 | | |
| R40 | 18K | 1 | | |
| R41 | 68K | | | |
| R42 | 100K | | | |
| R43 | 470K | | | |
| R44 | 180K | | | |
| R45 | 100K | | | |
| R46 | 100K | | | |
| R47 | 100K | | | |
| R48 | 1.5meg | | | |
| R49 | 180Ω | | | |
| R50 | 180Ω | | | |
| R51 | 220K | | | |
| R52 | 1meg | | | |
| R53 | 4700Ω | | | |
| R54 | 1meg | | | |
| R55 | 1meg | | | |
| R56 | 82K | | | |
| R57 | 12K | | | |
| R58 | 56K | | | Note 1 |
| R59 | 47K | | | |
| R60 | 390K | | | |
| R61 | 1200Ω 5% | | IR-191 | |
| R62 | 3300Ω | | | |
| R63 | 390K | | | |
| R64 | 47K | | | |
| R65 | 180Ω | | | |
| R66 | 8800Ω | | | |
| R67 | 35Ω | 10 | WR-39 | |
| R68 | 4.7Ω | 5 | F-10 | |

Note 1. Some versions may use an 82K paralleled by 150K or a 68K in this application.

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No | USE | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | TRAV-LER PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Rogers PART No. | Stancor PART No | Thordarson PART No. | Triad PART No. | |
| T1 | Horiz. Output | TR-34 | | | | | | | | |
| T2 | Vert. Output | TR-33 | Z1900 ① | | X54 * | | HO-297 * | 28875 ② | D-124 | |
| T3 | Yoke (Horiz. 24.5MH) (90°) (Vert. 11.5MH) | L-154 | | | | | | | A-113Z Y-47 & NW-23 | |
| | Rear Cover & Centering Device | MP-112 | | | | | | | | |
| | Yoke Clamp | ST-35 | | | | | | | | |

① Connect #1 to plate, #2 to B+, #7 to yoke terminal #4, and #10 to yoke terminal #6.
② Connect #1 to plate, #2 to B+, #7 to yoke terminal #6, #10 to yoke terminal #4.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | TRAV-LER PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T4 | 4300Ω | 3-4Ω | AT-32 | Z1107 ① | A-3026 | AU-601 ① | A-3877 ① | 24351 ① | S-6X | ① Drill one new mounting hole. |

## COILS (RF-IF)

| ITEM No | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | TRAV-LER PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | |
| L1 | 1st Video IF | L-130 | | | | | |
| L2 | 2nd Video IF | L-131 | | | | | |
| L3 | 3rd Video IF | L-123 | | | | | |
| L4 | RF Choke | L-133 | 19-1006 | | 4624 | | 18 Microhenries |
| L5 | Shunt Peaking Coil | L-128 | 19-3860 | | 6148 | | 710 Microhenries |
| L5A | 4.5MC Trap | L-125 | | | | | |
| L6 | 1st Sound IF | | | | | | |
| L7 | Shunt Peaking Coil | L-122 | 19-4400 ▲ | | 6134 ▲ | | 395 Microhenries, wound on 3900Ω resistor |
| L8 | Series Peaking Coil | L-126 | 19-3180 * | TV-184 * | 6180 | | 185 Microhenries, wound on 47K resistor |
| L9 | 2nd Sound IF | L-129 | | | | | |
| L10 | Quadrature Coil | L-134 | | | 1480 | | |
| L11 | RF Choke | L-59 | | | | | 7.5 Microhenries, IRC Part #CLA |

▲ Parallel with 3900Ω resistor. * Parallel with 47K resistor.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | TRAV-LER PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | Thordarson PART No. | |
| L12 | | | L-132 | 19-1275 | | 6210 ① | | 28-4 | |

① Enlarge mounting hole. A 390mmf capacitor may have to be used in place of .0066 (C59).

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | DC RES. | INDUCTANCE @ CURRENT 1000 ~(\) | TRAV-LER PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| L13 | 280A | 22Ω | 5 Hy. | FC-9 | C5041 ① | C-2996 ① | | C-2326 ① | 26C44 ① | C-27X |

① Drill one new mounting hole.

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | TRAV-LER PART No | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K3 | Sync Coupler | 270mmf, 35mmf., 10000mmf, 330K, 2.2meg | CC-95 | Aerovox<br>Centralab<br>Sprague | PA-533<br>PC-353<br>ST-3 |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | TRAV-LER PART No. | QUAM PART No. | |
| SP1 | 4" | PM | 3-4Ω | SPK-68 | 4A07 | |

## RECTIFIERS

| ITEM No. | RATING | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | TRAV-LER PART No | FEDERAL PART No. | GENERAL ELECTRIC PART No | INTERNATIONAL PART No | SARKES TARZIAN PART No. | |
| M1 | .280A | SR-8 ① | 1N23A ① | 1N1007 ② | RS350SL ① | 350A ① | ① Selenium Type. |
| M2 | | SR-13 ① | 1N215 ①② | | 1T1 ①③ | | ② Germanium Type. |
| | | | | | | | ③ 2 Required. |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | TRAV-LER PART No. | CBS PART No. | SYLVANIA PART No. | |
| M3 | 1N60 * | SC-6 | 1N60 | 1N60 | Video Detector (Pigtail) |

* A CK-706A or 1N295 may be used in some versions.

## MISCELLANEOUS

| ITEM No. | PART NAME | TRAV-LER PART No. | NOTES |
|---|---|---|---|
| M4 | Tuner | 1-3067 | VHF |
| | Tuner | TA-45 | UHF |
| | Ion Trap | MA-7 | |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

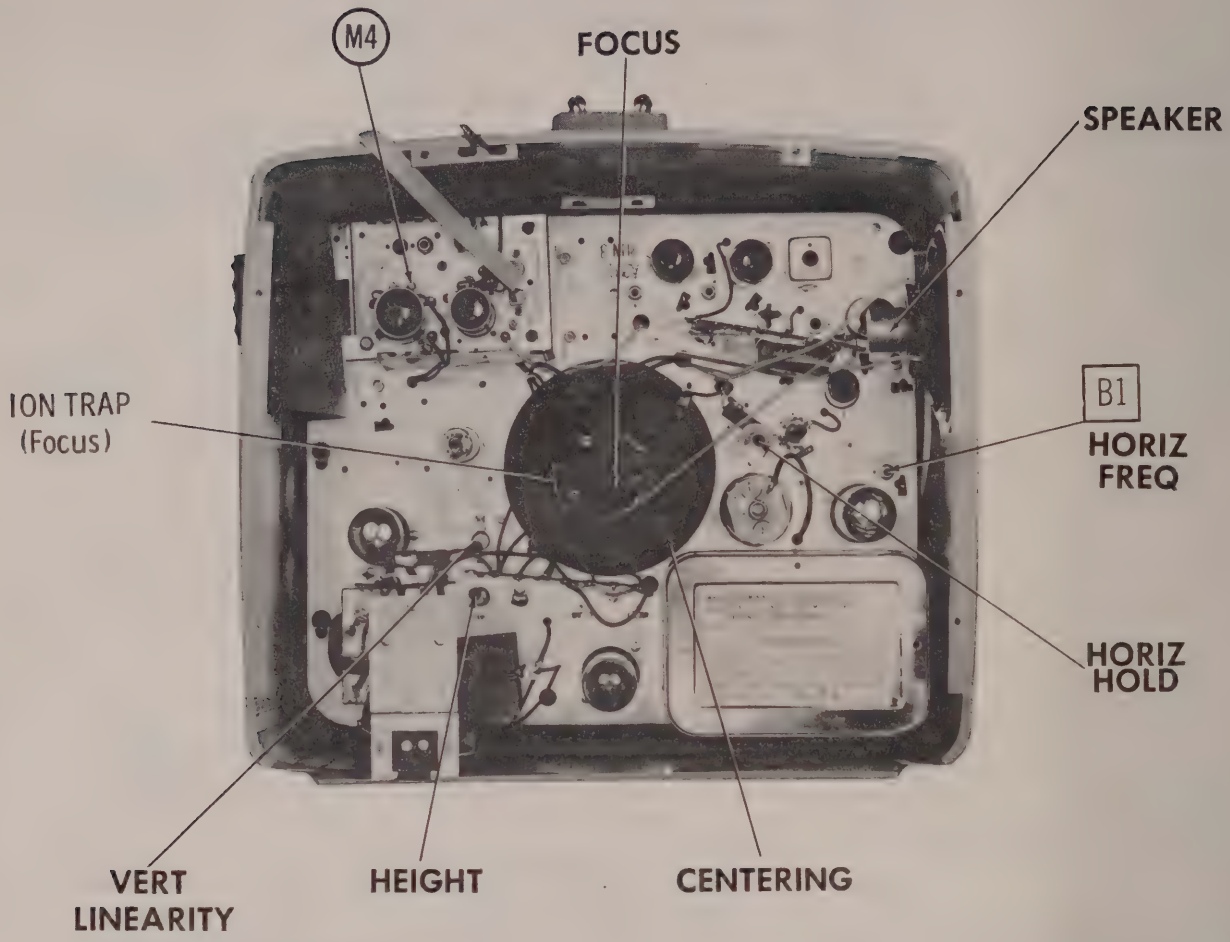
| NAME | PART NO | DESCRIPTION |
|---|---|---|
| Safety Glass | DW-87T | Model 1468 |
| Safety Glass | DW-87 | Model 1465 |
| Knob | K-282 | Channel Selector |
| Knob | K-280 | Fine Tuning |
| Knob | K-281 | Control (4 used) |
| Handle | L-122 | Includes Antenna, Model 1466 |
| Handle | CH-68 | Model 1465 |
| Foot | MP-110 | Cabinet |

## WIRING DATA

| | |
|---|---|
| High Voltage Lead | Use BELDEN No. 8869 |
| Shielded Hook-up Wire | Use BELDEN No. 8685 (Single Conductor)<br>8716 (Two Conductor) |
| General-use Unshielded Hook-up Wire | Use BELDEN No. 8530 (Solid) Available in Ten Colors<br>8534 (Stranded) Available in Ten Colors |
| Power Cord (Interlock Type) | Use BELDEN No. 8778 |
| 300Ω Tuner Input Lead | Use BELDEN No. 8225 |
| 300Ω Antenna Lead-in | Use BELDEN No. 8230 or 8275 |
| Antenna Rotor Cable | Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor<br>8485 (Round) - 5 Conductor<br>8488 (Round) - 8 Conductor |

TRAV-LER MODELS 1465, 1466 (Ch. 945-18)

FOLDER 2

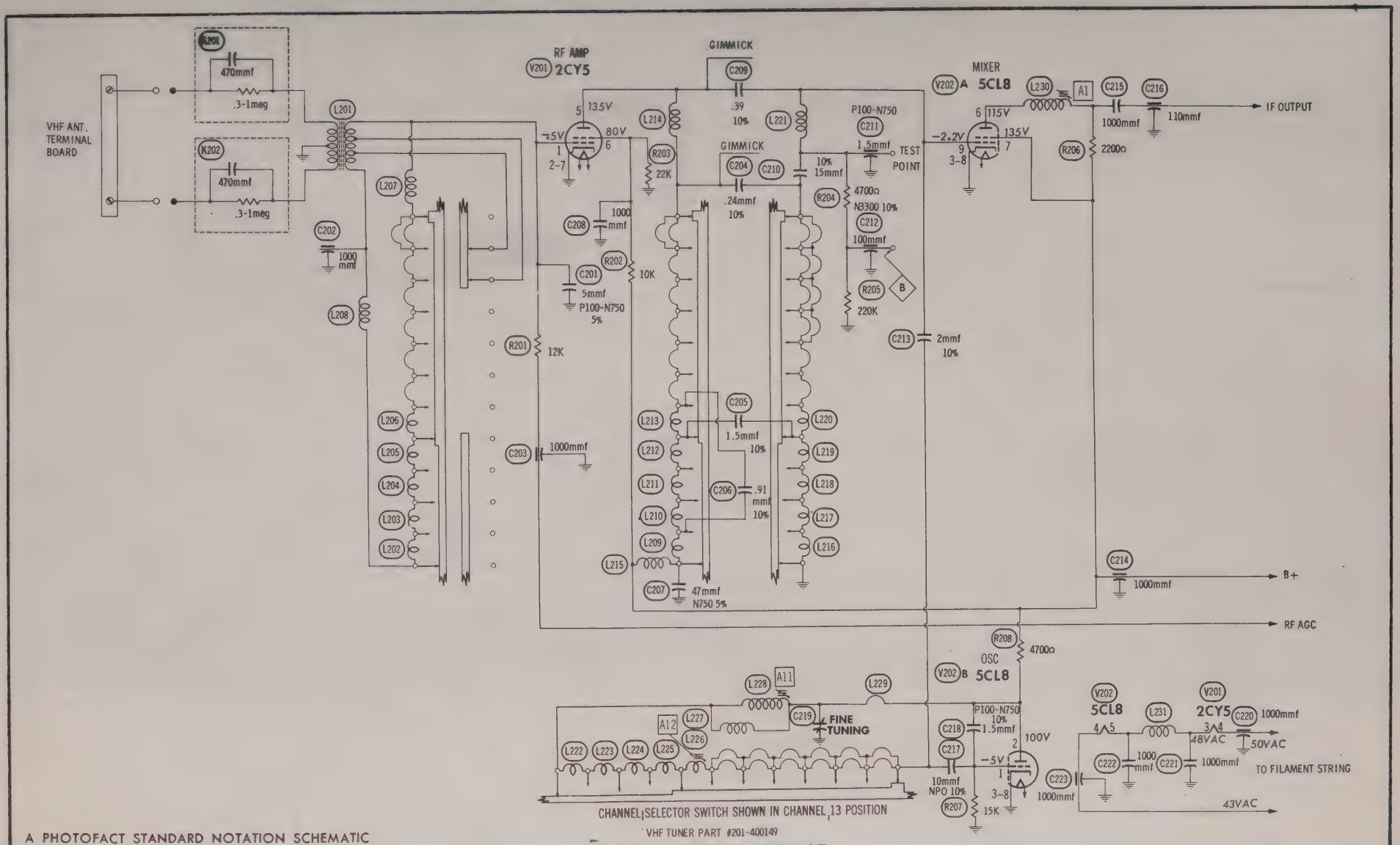



## CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ADJUSTMENTS

1. Turn the set on and tune in a TV station, preferably with a test pattern.
2. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.
3. Check other stations and if necessary, retouch B1 for best sync action on all channels.




A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

# VHF TUNER TA-45

## TRAV-LER MODELS 1465, 1466 (Ch. 945-18)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, -2)

## IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, -2)

MODEL H-21T217 (Ch. V-2366-1)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 3 push-on type knobs from the front.
2. Remove 8 metal screws holding rear cover. Remove the rear cover.
3. Remove 1 metal screw holding antenna terminal board.
4. Remove speaker leads.
5. Remove 2 metal screws from inside at extreme upper left and right hand corners holding front escutcheon.
6. Remove 3 metal screws holding front excutcheon at the front. Remove front escutcheon.
7. Remove 4 push-on type thumbwheels.
8. Remove 4 metal screws holding control bracket to the cabinet.
9. Remove 5 bottom chassis bolts. Remove chassis.

MODEL H-21T217 (Ch. V-2366-1)

**CAUTION**

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

| | | | |
|---|---|---|---|
| TRADE NAME | Westinghouse | MODELS | CHASSIS |
| | | H-21K204D, H-21K205D, H-21T201D, H-21T202D, H-21T203A, H-21T217 ..... | V-2366-1 |
| | | H-21TU203A ..... | V-2366-2 |
| MANUFACTURER | Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J. | | |
| TYPE SET | Television Receiver | | |
| TUBES | VHF-Sixteen, UHF-Seventeen | | |
| POWER SUPPLY | 105-120 Volts AC, 60 Cycle | RATING 125 Watts, 1.2 Amp. @ 117 Volts AC | |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

# SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF tuner is possible by removing the Channel Selector, Fine Tuning knob and the escutcheon plate (See Disassembly Instructions). Set the Fine Tuning to the center of its range. One slug for high band adjustment is located a 11 o'clock, and should be adjusted first. The low band adjustments are located at 7 o'clock. Adjust for best picture and sound.

SAFETY GLASS REMOVAL

Remove 3 metal screws holding safety glass metal trim strip at top. Pull top of safety glass out and lift to remove.

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

Adjust the Ion Trap for best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Multivibrator, it is necessary to remove the rear cover and supply power to the set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Frequency slug (B2) until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Quieting control for MINIMUM buzz and maximum sound. (For location, see tube placement chart.)

FUSE DEVICE

A 7.5Ω fusible resistor (R87) is used for low voltage power supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

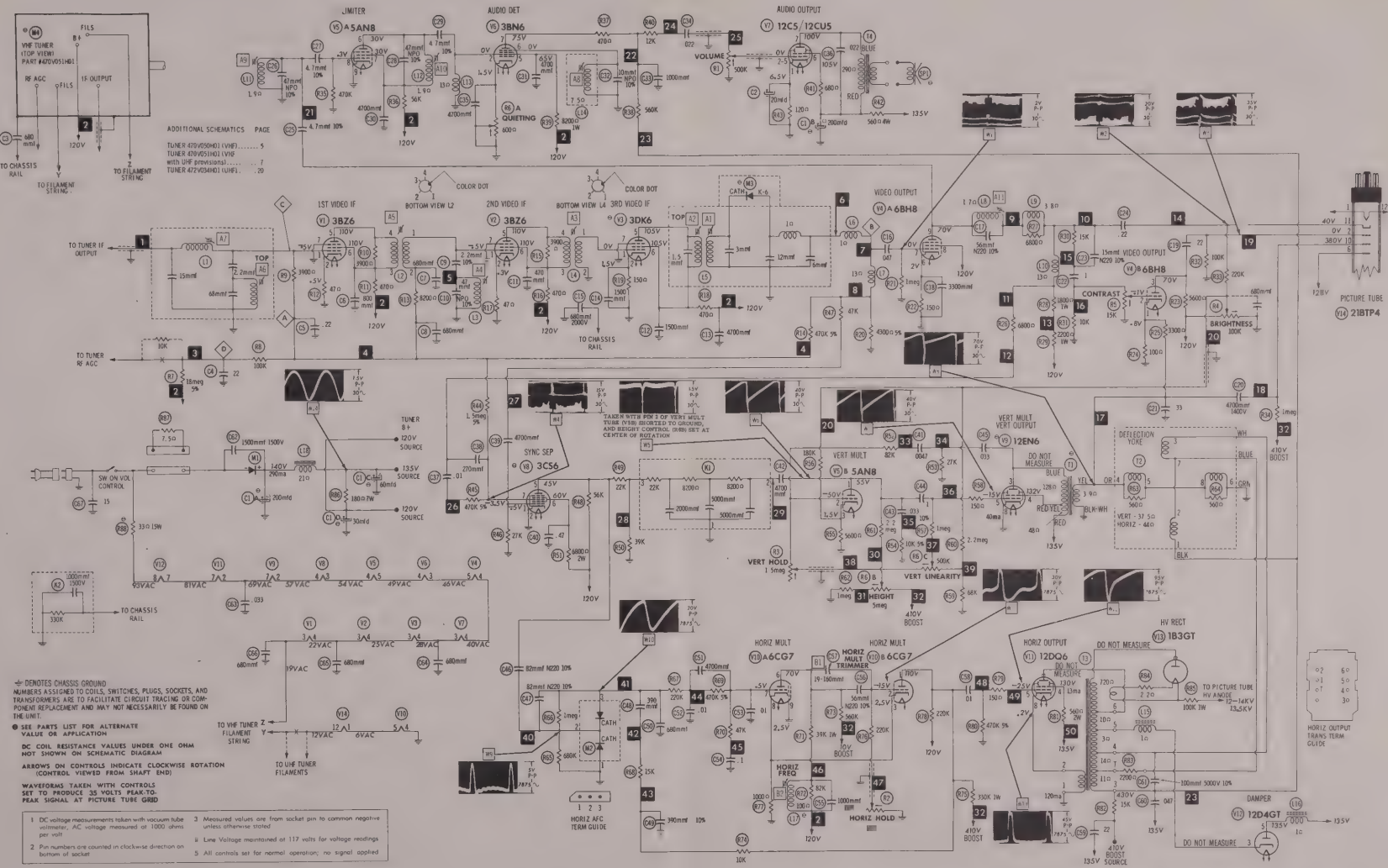
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

J76

DATE 4-59 SET 439 FOLDER 3

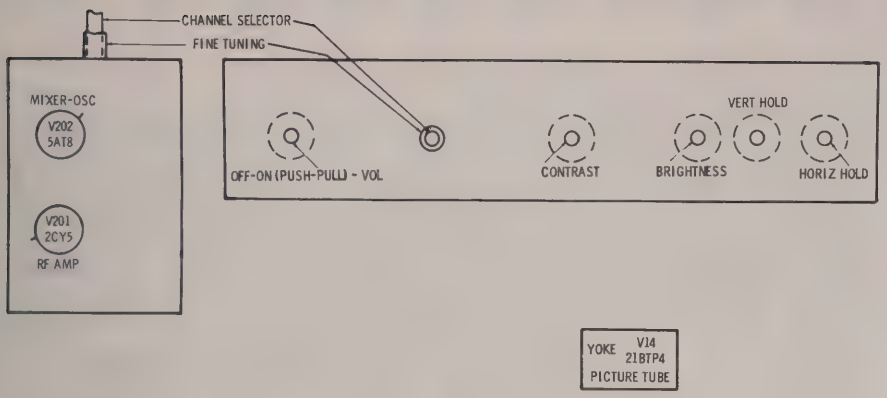
WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, -2)

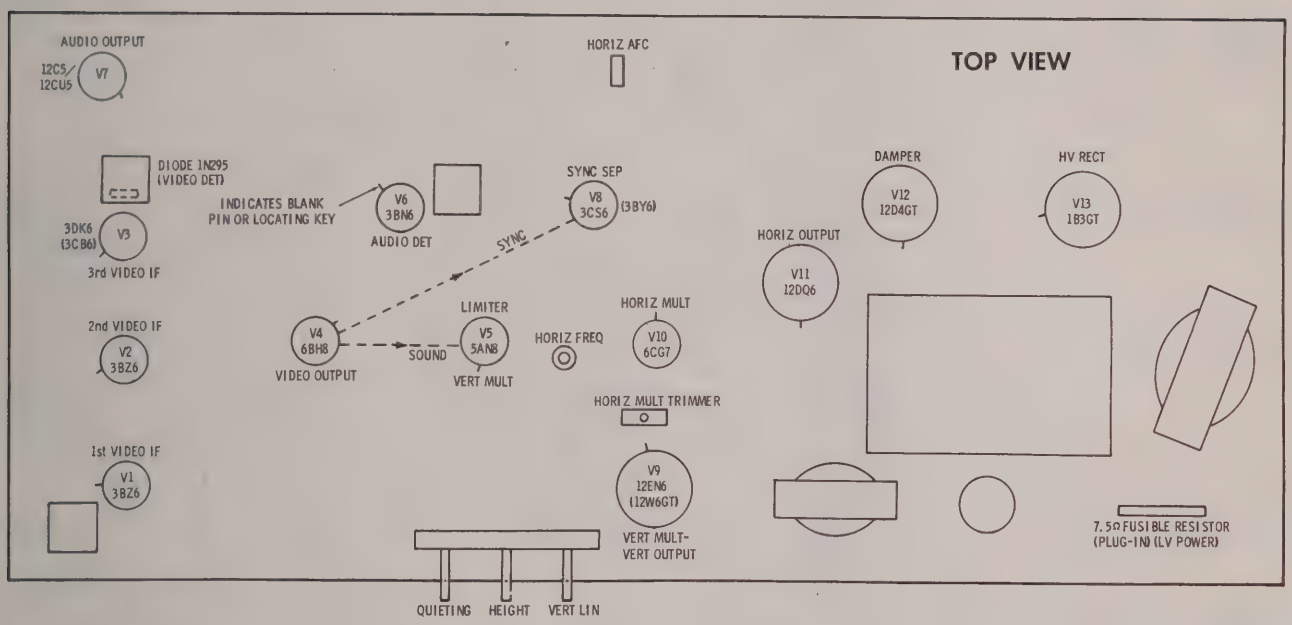
SET 439 FOLDER 3


LIMITER
AUDIO DET
AUDIO OUTPUT
VOLUME
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO OUTPUT
TO TUNER IF OUTPUT
TO TUNER RF AGC
SYNC SEP
VERT MULT
VERT MULT VERT OUTPUT
VERT HOLD
VERT LINEARITY
HEIGHT
CONTRAST
BRIGHTNESS
PICTURE TUBE
HORIZ MULT
HORIZ MULT TRIMMER
HORIZ OUTPUT
HV RECT
HORIZ FREQ
HORIZ HOLD
DAMPER
DEFLECTION YOKE
SW ON VOL CONTROL
TO CHASSIS RAIL
TO TUNER B+ 120V SOURCE
TO TUNER B+ 135V SOURCE
TO VHF TUNER FILAMENT STRING
TO UHF TUNER FILAMENTS
HORIZ AFC TERM GUIDE
HORIZ OUTPUT TRANS TERM GUIDE
410V BOOST
410V BOOST SOURCE
DO NOT MEASURE
TO PICTURE TUBE HV ANODE
12-14KV
13.5KV
ADDITIONAL SCHEMATICS PAGE
TUNER 470V050H01 (VHF) ..... 5
TUNER 470V051H01 (VHF with UHF provisions) ..... 7
TUNER 472V034H01 (UHF) ..... 20
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 35 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE GRID
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
ii Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation; no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W Sams & Co, Inc 1959

**WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, -2)**

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

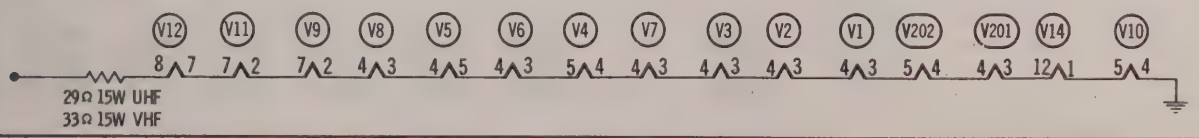
**POWER SUPPLY FAILURE**
No raster, no sound Fusible Resistor (7.5Ω), Rectifier (B+)

**SWEEP FAILURE**
No raster, has sound Rectifier (Horiz. AFC), V10, V11, V12, V13, V14,
No vertical deflection V5, V9 Rectifier (B+)
Poor vert. linearity or foldover V5, V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rectifier (B+)
Vert. off freq. V5, V9
Horiz. off freq. V10

**LOSS OF PICTURE OR SOUND**
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V5, V6, V7

**SYNC FAILURE**
No vert. sync V8
No horiz. sync V8, Rectifier (Horiz. AFC)
No vert. or horiz. sync V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PRINTED BOARD

A Howard W. Sams CIRCUITRACE® Photo

WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, 2)

FOLDER 3

WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D,
202D, 203A, 217, H-21TU203A (Ch. V-2366-1, 2)
VHF TUNER 470V051H01
FOLDER 3
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959
RF AMP
V201 2CY5
MIXER
MIXER PLATE COIL
V202 A 5AT8
OSC
V202 B 5AT8
IF OUTPUT
RF AGC
B+
TO FILAMENT STRING
19VAC
14VAC
12VAC
HI BAND COUPLING
FINE TUNING
TEST POINT
VHF ANT TERM BOARD
L201
L202
K201
K202
A201
A202
A203
A204
C201 100mmf N2200 5%
C202 22mmf N750 10%
C203 1000mmf
C204 1000mmf
C205 120mmf N2200 10%
C206 1.8mmf 10%
C207 18mmf NPO 5%
C208 2.2mmf N2200
C209 10mmf NPO
C210 6.8mmf
C211 1.5mmf N2200
C212 .68 10%
C213 1000mmf
C214 800mmf
C215 120mmf
C216 1000mmf
C217 1000mmf
C218 1000mmf
C219 1000mmf
C220 1000mmf
R201 10K
R202 15K 5%
R203 47K
R204 15K 5%
R205 3300Ω
R206 100K
R207 1800Ω
R208 4700Ω
330mmf
220K
-9V
-2V
-3.5V
115V
75V
105V
8.5V

# TUNER PARTS LIST AND DESCRIPTIONS

## 470V051H01

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V201 | RF Amp. | 2CY5 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V202 | Mixer-Osc. | 5AT8 | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | Westinghouse PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C201 | 100 | | | | | | | | N2200 5% |
| C202 | 22 | | 690V013H15 | NPO-DI 22 | DTN-22 | C10Q22U | CN7-422 | 5TCC-Q22S 10% * | N750 10% |
| C203 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C204 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C205 | 120 | | 690V004H17 | | | | | | N2200 10% |
| C206 | 1.8 | | 690V004H72 | | | | | | 10% |
| C207 | 18 | | 690V013H36 | | TCZ-18 | C10Q18C | CNO-418 | 5TCC-Q18S 5%* | NPO 5% |
| C208 | 2.2 | | V-1913-1 | | | | | | N2200 |
| C209 | 10 | | 690V013H09 | NPO-DI 10 | DTZ-10 | C10QIC | CNO-410 | 5TCC-QI | NPO |
| C210 | 6.8 | | 690V013H21 | DI-6.8 | DTZ-6R8 | LI0V68 | CNO-568 | 5TCCB-V68 | |
| C211 | 1.5 | | 690V013H19 | | | | | | N2200 |
| C212 | .68 | | 690V013H53 | | TCZ-R68 | LI0V68 | | | 10% |
| C213 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C214 | 800 | | 690V013H13 | BPD-0008 | DD-801 | LI0T8 | B-382 | 5GA-T8 | |
| C215 | 120 | | 690V013H54 | | | | | | |
| C216 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C217 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C218 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C219 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |
| C220 | 1000 | | 690V013H14 | EF-001 | MFT-1000 | | | 503C-DI | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | Westinghouse PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R201 | 10K | | 250V221A03 | |
| R202 | 15K 5% | | 250V211A53 | |
| R203 | 47K | | 250V224A73 | |
| R204 | 15K 5% | | 250V211A53 | |

| ITEM No. | RATING | | Westinghouse PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R205 | 3300Ω | | 250V223A32 | |
| R206 | 100K | | 250V221A04 | |
| R207 | 1800Ω | | 250V221A82 | |
| R208 | 4700Ω | | 250V224A72 | |

## COILS (RF-IF)

| ITEM No. | USE | Westinghouse PART No. | NOTES |
|---|---|---|---|
| L201A B | Ant. Trans. RF Choke | 690V013H52 | Includes C201 |

| ITEM No. | USE | Westinghouse PART No. | NOTES |
|---|---|---|---|
| L202 | Mixer Plate Coil | 690V013H38 | |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | Westinghouse PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K201 | Ant. Input | 330mmf, 220K | 219V004H02 | Centralab<br>Sprague | RC-431<br>PRC-2 |
| K202 | Ant. Input | 330mmf, 220K | 219V004H02 | Centralab<br>Sprague | RC-431<br>PRC-2 |

# TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNER 470V051H01

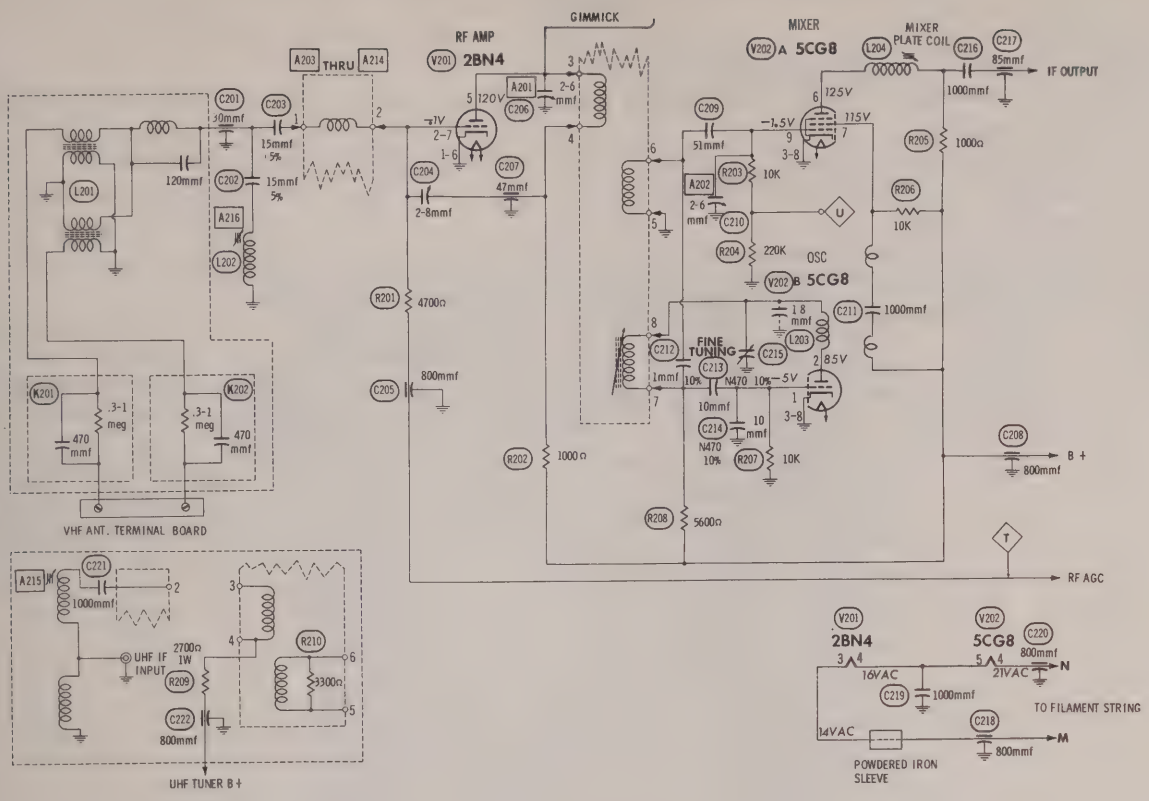
Suggested Alignment Tools:
A201 thru A204 ... GENERAL CEMENT #8607, 9294
WALSCO #2523, 2534, 2538
Mixer Plate Coil GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VHF OSCILLATOR ALIGNMENT

Set the Fine Tuning at the center of its range. Tune in the highest high band channel operating in the area and adjust A201 for best picture and sound. Check remaining high band channels and if necessary make a compromise adjustment of A201. Channels 6 and 5 are adjusted by means of A202, channels 4 and 3 by A203, and channel 2 by A204. Make compromise adjustments, if necessary when 2 channels share the same adjustment.

VHF RF AND MIXER ALIGNMENT

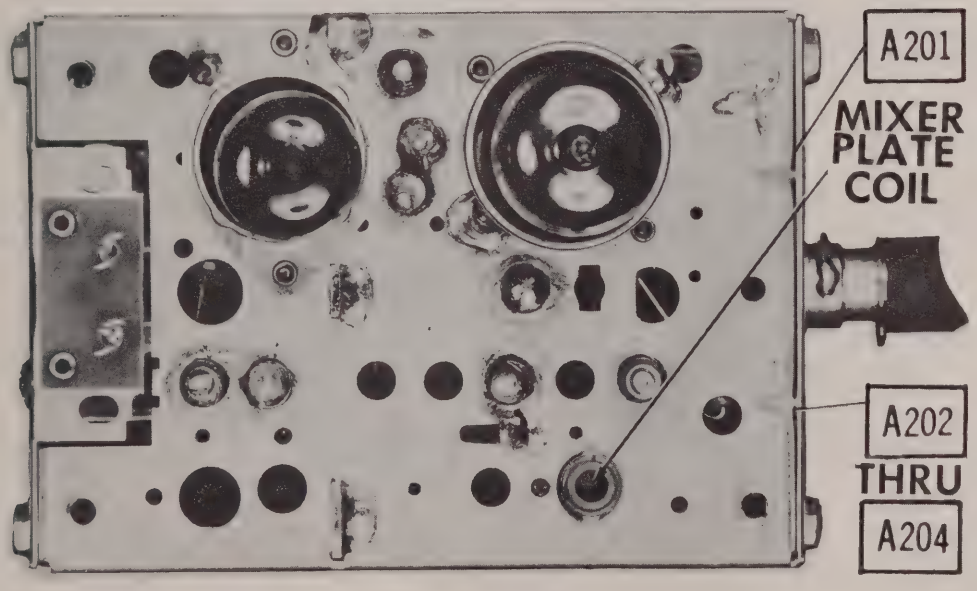
This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.




A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

VHF TUNER with UHF provisions 470V050H01




TUNER 470V051H01 - TOP VIEW

SET 439 FOLDER 3

# TUNER ALIGNMENT INSTRUCTIONS

## 470V050H01

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, thru a hole in the right side of the tuner rear cover as viewed from the rear. Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2.5 volt bias supply to point (T). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | Fig. 201 | Across antenna terminals thru matching network (Fig. 201). | 195MC | 193.25MC<br>197.75MC | 10 | Vert. Amp. thru 10K to point (V). Low side to chassis. | A201, A202 | Adjust A201 and A202 for maximum amplitude and symmetry with markers as shown in Fig. 202. |
| 2. | " | " | 213MC | 211.25MC<br>215.75MC | 13 | " | A203 | Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns. Coils are accessible thru rectangular hole on left side of tuner rear cover when viewed from rear. |
| | | | 207MC | 205.25MC<br>209.75MC | 12 | | A204 | |
| | | | 201MC | 199.25MC<br>203.75MC | 11 | | A205 | |
| | | | 195MC | 193.25MC<br>197.75MC | 10 | | A206 | |
| | | | 189MC | 187.25MC<br>191.75MC | 9 | | A207 | |
| | | | 183MC | 181.25MC<br>185.75MC | 8 | | A208 | |
| | | | 177MC | 175.25MC<br>179.75MC | 7 | | A209 | |
| | | | 85MC | 83.25MC<br>87.75MC | 6 | | A210 | |
| | | | 79MC | 77.25MC<br>81.75MC | 5 | | A211 | |
| | | | 69MC | 67.25MC<br>71.75MC | 4 | | A212 | |
| | | | 63MC | 61.25MC<br>65.75MC | 3 | | A213 | |
| | | | 57MC | 55.25MC<br>59.75MC | 2 | | A214 | |

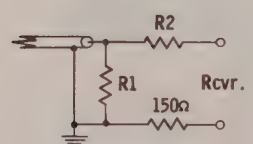
UHF TUNER ALIGNMENT

Connect the negative lead of a 2.5 volt bias supply to point (T). Positive to chassis.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use 10MC sweep unless otherwise noted.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 3. | Fig. 201 | Across UHF antenna terminals thru matching network (Fig. 201). | 605MC | 603.25MC<br>607.75MC | 36 | Vert. Amp. thru 10K acorss Video Detector load. | A215 | Adjust sweep generator output to obtain 2 volts peak to peak on scope. Adjust A215 for response similar to Fig. 203. Check response at low and high end of UHF band. The response should be within limits shown in Fig. 203. |

44MC TRAP

The antenna trap adjustment (A216) is normally set at the factory at 44MC. However, A216 may be adjusted to attenuate any interference between 40MC and 46MC.




Zo = Impedance of Cable

| Zo | R1 | R2 |
|---|---|---|
| 50Ω | 56Ω | 120Ω |
| 75Ω | 82Ω | 110Ω |

FIG. 201

FIG. 202

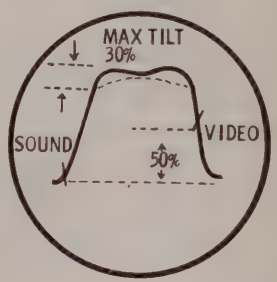
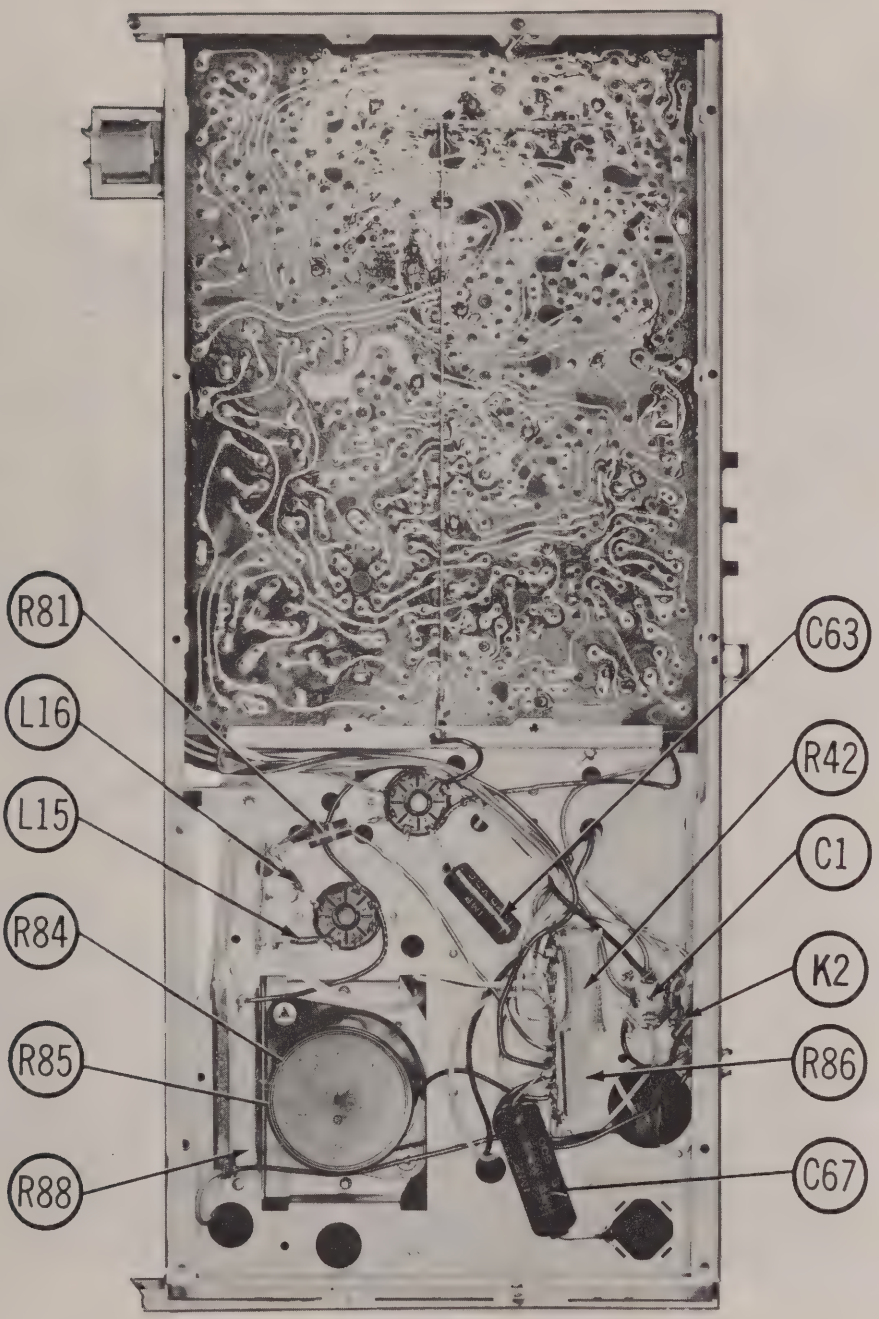
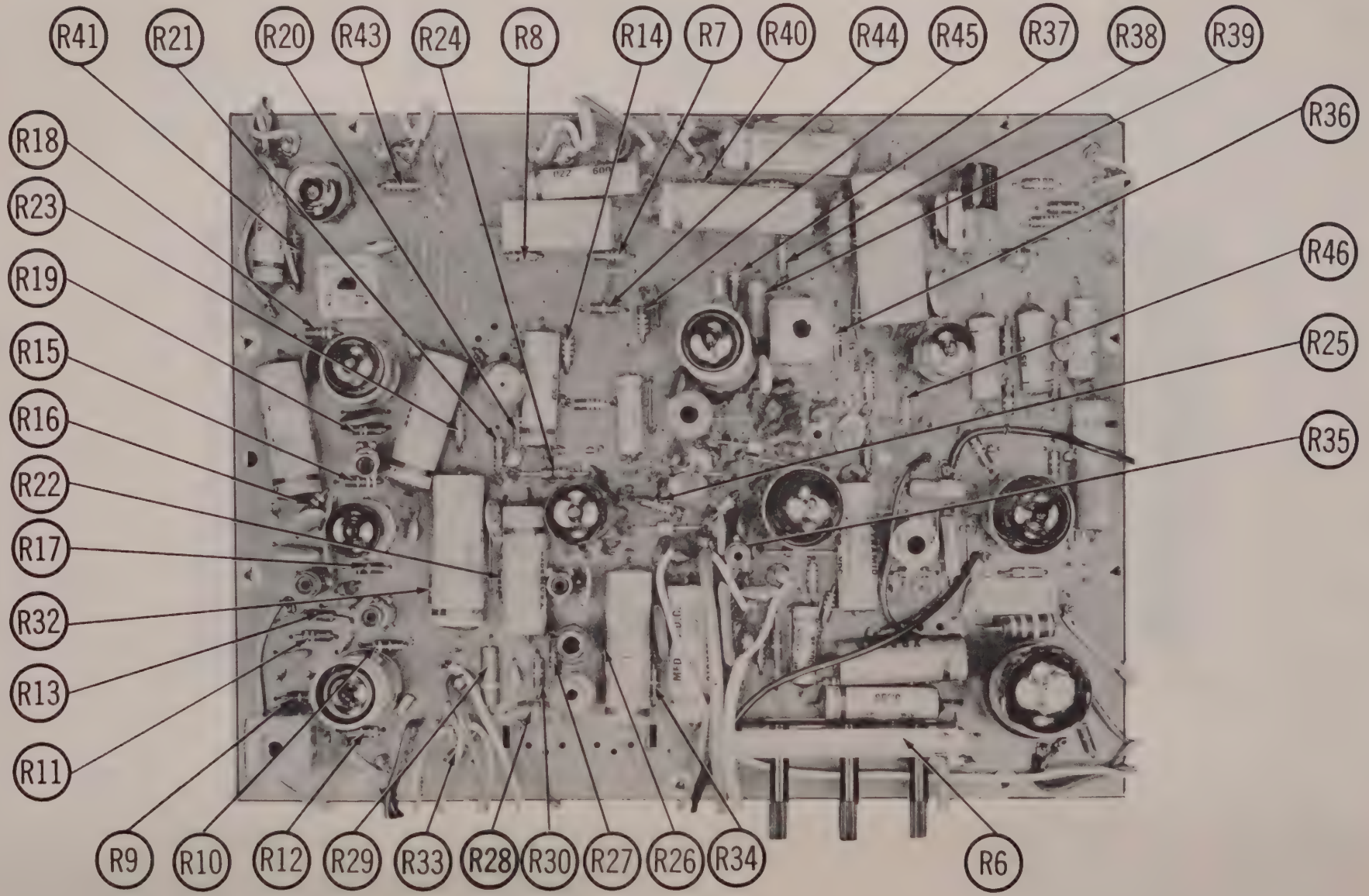



FIG. 203




CHASSIS-BOTTOM VIEW




PRINTED BOARD - RESISTOR IDENTIFICATION (R6-R46)

# ALIGNMENT INSTRUCTIONS



PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER to PROTECT the Test Equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Use only enough generator output to provide a usable indication on VTVM.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect a 470mmf capacitor across the input leads of the VTVM and Oscilloscope.
Detune Mixer Plate Coil.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .001mfd | High side to pin 1 (grid) of 3DK6 (V3). Low side to chassis. | 43.9MC (10MC Swp) | 43.9MC | Any non-interfering channel | Vert. Amp. thru 47K to point (B). Low side to chassis. (Across Video Det. load) | A1, A2 | Adjust A1 for maximum amplitude and A2 to rock response about marker. |
| 2. | " | High side to point (C). Low side to chassis. | Not used | 43.1MC (Unmod) | " | USE VTVM DC probe thru 47K to point (B). Common to chassis. | A3 | Adjust for maximum deflection. |
| 3. | " | " | " | 47.25MC | " | " | A4 | Adjust for MINIMUM deflection. |
| 4. | " | " | " | 45.2MC | " | " | A5 | Adjust for maximum deflection. |
| 5. | " | " | 44MC (10MC Swp) | 41.25MC<br>42.25MC<br>43.0MC<br>44.0MC<br>45.0MC<br>45.75MC<br>47.25MC | " | Vert. Amp. thru 47K to point (B). Low side to chassis. | | Check for response similar to Fig. 1, and if necessary, retouch A3 and A5. |
| 6. | Direct | High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis. | Not used | 41.25MC (Unmod) | 12 or 13 | DC probe thru 47K to point (B). Low side to chassis. | A6 | Adjust for MINIMUM deflection. |
| 7. | Fig. 2 | Across antenna terminals thru matching network in Fig. 2. | " | 59.75MC (Unmod) | 2 | " | Fine Tuning | Connect the negative lead of a 2.5 volt bias supply to point (D). Positive to chassis. Adjust for MINIMUM deflection. |
| 8. | " | " | 57MC (10MC Swp) | 55.25MC<br>59.75MC | " | Vert. Amp. thru 47K to point (B). Low side to chassis. | Mixer Plate Coil & A7 | Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. Adjust Mixer Plate Coil for maximum amplitude and A7 for proper shape of curve. |

SOUND IF ALIGNMENT

Tune in a TV signal and connect an adjustable attenuator between the antenna lead-in and the receiver terminals so that the signal may be varied from strong to weak.
Set the Quieting control to the center of its range.
Apply a strong signal to the receiver and adjust A8 for maximum volume. If peaks occur at two widely separated positions, use the one with the slug farthest from the chassis. If two peaks occur within a narrow range of adjustment, sufficient signal is not being applied to the receiver or the Quieting control is not preset to the proper position.
Reduce the signal strength to the level which allows noise and hiss to be heard. Adjust A9 and A10 for maximum undistorted sound and retouch A8 for maximum undistorted sound. If peaks occur at two different positions, use the peak with the slug farthest from chassis.
Increase the signal level to maximum and retouch A8 for maximum volume.
Using a strong signal, adjust the Quieting control for MINIMUM buzz.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and adjust the Fine Tuning until a 4.5MC beat pattern is visible in the picture. Adjust A11 for MINIMUM beat pattern in the picture.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6 & 8

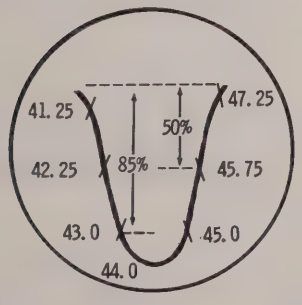
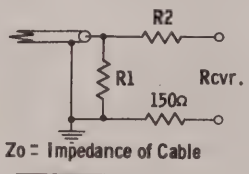


FIG.1




| Zo | R1 | R2 |
|---|---|---|
| 50Ω | 56Ω | 120Ω |
| 75Ω | 82Ω | 110Ω |

FIG.2

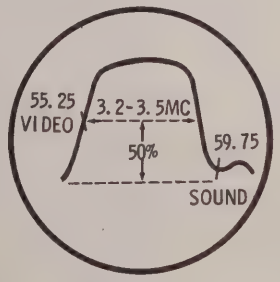


FIG.3

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | 1st Video IF Amp. | 3DZ6 | |
| V2 | 2nd Video IF Amp. | 3DZ6 | |
| V3 | 3rd Video IF Amp | 3DX6 | 3CB6 * |
| V4 | Video Output-Video Output | 6BH6 | |
| V5 | Limiter-Vert. Mult. | 5AN8 | |
| V6 | Audio Det. | 3BN6 | |
| V7 | Audio Output | 12C5/ 12CU5 | |

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V8 | Sync Sep | 3CS6 | 3BY6 * |
| V9 | Vert Mult.-Vert Output | 12EN6 | 12W6GT * |
| V10 | Horiz Mult. | 6CG7 | |
| V11 | Horiz Output | 12DQ6 | |
| V12 | Damper | 1204GT | |
| V13 | HV Rect. | 1B3GT | |

## PICTURE TUBE

| ITEM No | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|
| | Westinghouse PART No. | GENERAL ELECTRIC PART No. | RCA PART No. | SYLVANIA PART No. | |
| V14 | 21BTP4 | 21BTP4 ① | 21BTP4 ② | 21BTP4 ② | ① "Aluminized"<br>② "Silverama" ③<br>③ "Silver Screen 85" |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | Westinghouse PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1A | ▲200 | 175 | 21BV008H02 ① | AFH34-01-55 | | WP412-1 | | TVL3-4450* | |
| B | ▲200 | 175 | | | | | | | |
| C | ▲60 | 175 | | | | | | | |
| D | 30 | 175 | | | | | | | |
| C2 | 20 | 25 | 21BV035H10 | SRE25V20 | BBR20-25 | TT25X20 | TD-25-25 | TVA-1410 | |

① Alternate Part #21BV018H01.
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | Westinghouse PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C3 | 680 | 2000 | | 21SV300H19 | HVD-30-680 | DD30-681 | HVB20T68 | 2HV-368 | | |
| C4 | .22 | 200 | | 21OV002A34 | P288N-22 | | CUB2P22 | GEM-2022 | 3TM-P22 | |
| C5 | .22 | 200 | | 21OV002A34 | P288N-22 | | CUB2P22 | GEM-2022 | 3TM-P22 | |
| C6 | 800 | | | 21SV300H18 | BPD-0068 | DD-801 | BYA10T68 | B-368 | 5GA-T8 | |
| C7 | 680 | | | 21SV116A81 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C8 | 680 | | | 21SV116A81 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C9 | 2.2 | | 10% | 21SV003A19 | NPO-SI 2.2 | TCZ-2R2 | C10Y2C | CNO-522 | 5TCCB-Y22S 10%* | |
| C10 | 47 | | NPO 10% | 21SV124A70 | NPO-DI 47 | DTZ-47 | C10Q47C | CNO-547 | 5TCC-Q47S 10% * | |
| C11 | 470 | | | 21SV300H07 | BPD-00047 | DD-471 | BYA10T47 | B-347 | 5GA-T47 | |
| C12 | 1500 | | | 21SV300H08 | BPD-0015 | DD-152 | BYA10D15 | B-315 | 5HK-D15 | |
| C13 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C14 | 1500 | | | 21SV300H28 | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | |
| C15 | 680 | 2000 | | 21SV300H19 | HVD-30-680 | DD30-681 | HVB20T68 | 2HV-368 | | |
| C16 | .047 | 400 | | 21OV014A73 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C17 | 56 | | N220 10% | 21SV015A60 | | | | | | |
| C18 | 3300 | | | 21SV003A33 | BPD-0033 | DD-332 | BYA10D33 | B-233 | 5HK-D33 | |
| C19 | .22 | 400 | | 21OV002A34 | P488N-22 | | CUB4P22 | GEM-4022 | 4TM-P22 | |
| C20 | 4700 | 1400 | | 21SV300H01 | HVD-15-4700 | DD30-472 | HVC16D47 | 2HV-217 | 20HK-D478 * | |
| C21 | .33 | 200 | | 21SV003A34 | P288N-33 | | CUB2P33 | GEM-3033 | 2TM-P33 | |
| C22 | .1 | 600 | | 21OV101A04 | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C23 | 15 | | N220 10% | 21SV011A50 | | | | | | |
| C24 | .22 | 400 | | 21OV002A34 | P488N-22 | | CUB4P22 | GEM-4022 | 4TM-P22 | |
| C25 | 4.7 | | 10% | 21TV014A79 | NPO-SI 4.7 | TCZ-4R7 | C10V47C | CNO-547 | 5TCCB-Y47S 10%* | |
| C26 | 47 | | NPO 10% | 21SV124A70 | NPO-DI 47 | DTZ-47 | C10Q47C | CNO-447 | 5TCC-Q47S 10% * | |
| C27 | 4.7 | | 10% | 21TV014A79 | NPO-SI 4.7 | TCZ-4R7 | C10V47C | CNO-547 | 5TCCB-Y47S 10%* | |
| C28 | 47 | | NPO 10% | 21SV124A70 | NPO-DI 47 | DTZ-47 | C10Q47C | CNO-447 | 5TCC-Q47S 10% * | |
| C29 | 4.7 | | 10% | 21TV014A79 | NPO-SI 4.7 | TCZ-4R7 | C10V47C | CNO-547 | 5TCCB-Y47S 10%* | |
| C30 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C31 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C32 | 10 | | NPO 10% | 21SV112A00 | NPO-DI 10 | DTZ-10 | C10Q1C | CNO-410 | 5TCC-Q1S 10% * | |
| C33 | 1000 | | | 21SV101A03 | BPD-001 | DD-102 | BYA10I | B-210 | 5HK-D1 | |
| C34 | .022 | 600 | | 21OV062A33 | P668N-022 | | CUB6S22 | GEM-6122 | 6TM-S22 | |
| C35 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C36 | .022 | 600 | | 21OV062A33 | P668N-022 | | CUB6S22 | GEM-6122 | 6TM-S22 | |
| C37 | .01 | 400 | | 21OV103A03 | P488N-01 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C38 | 270 | | | 21SV300H96 | BPD-00027 | DD-271 | L10T27 | B-327 | 5GA-T27 | |
| C39 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C40 | .47 | 400 | | 21SV104A74 | BPD-0047 | DF-503 | CUB4P47 | GEM-4047 | 4TM-P47 | |
| C41 | .0047 | 600 | | 21OV103D05 | P668N-0047 | DD15-502 | CUB6D47 | GEM-6247 | 6TM-D47 | |
| C42 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-347 | 5HK-D47 | |
| C43 | .033 | 600 | 10% | 21SV103E11 | | | PME253 | | 6TM-S33 10% * | |
| C44 | .1 | 400 | | 21OV101A04 | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C45 | .033 | 600 | | 21OV063A33 | P668N-033 | | CUB6S33 | GEM-6133 | 6TM-S33 | |
| C46 | 82 | | N220 10% | 21SV018A20 | | | | | | |
| C47 | 82 | | N220 10% | 21SV018A20 | | | | | | |
| C48 | 390 | | | 21SV300H33 | BPD-00039 | DD-391 | L10T39 | B-339 | 5GA-T39 | |
| C49 | 390 | | 10% | 21SV03A88 | | | 22S5T39 | MCB243 | M8-339 | |
| C50 | 680 | | | 21SV300H33 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C51 | 4700 | | | 21SV104A72 | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | |
| C52 | .01 | 400 | | 21OV103A03 | P488N-01 | DD-103 | CUB4S | GEM-411 | 4TM-S1 | |
| C53 | .01 | 400 | | 21OV051A03 | P488N-01 | DS-103 | CUB4S1 | GEM-411 | 4TM-S1 | |
| C54 | .1 | 400 | | 21OV101A04 | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C55 | 1000 | | 10% | 21SV07LA03 | 1464-001 | | LB3I8 | MCB256 | M8-31 | |
| C56 | 56 | | N220 10% | 21SV015A60 | | | | | | |
| C57 | 18-180 | | | 21TV501H01 | | | | | | |
| C58 | .01 | 400 | | 21OV103A03 | P488N-01 | DS-103 | CUB4S1 | GEM-401 | 4TM-S1 | |
| C59 | .22 | 400 | | 21OV102A34 | P488N-22 | | CUB4P22 | GEM-4022 | 4TM-P22 | |
| C60 | .047 | 600 | | 21OV024A73 | P668N-047 | DF-503 | CUB6S47 | GEM-6147 | 6TM-S47 | |
| C61 | 100 | 5000 | 10% | 21SV300H24 | | | | | 50GA-T18 10% * | |
| C62 | 1500 | 1500 | | 21SV201A52 | HVD-15-1500 | DD30-152 | HVC16D15 | 2HV-215 | 20GA-D158 * | |
| C63 | .033 | 600 | | 21OV123A33 | P668N-033 | | CUB6S33 | GEM-6133 | 6TM-S33 | |
| C64 | 680 | | | 21SV116A81 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C65 | 680 | | | 21SV116A81 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C66 | 680 | | | 21SV116A81 | BPD-00068 | DD-681 | BYA10T68 | B-368 | 5GA-T68 | |
| C67 | .18 | 600 | | 21OV018A54 | P688N-18 | | CUB6P18 | GEM-6018 | 6TM-P18 | |

* Not normally in distributors stock. Available thru distributor on order to manufacturer

## CONTROLS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | Westinghouse PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 50K | ½ | 270V061H01 | | RTV-665 | | PP55A | Volume |
| B | Switch | | | | Not Req. | | Not Req. | Pull-on Type |
| R2A | 60K | ½ | 270V032H01 | B-35 | A47-75K-S | QU-135 | | Horiz. Hold |
| B | Shaft | | | Not Req. | ES6-3 | Not Req. | | |
| R3A | 1.5meg | ½ | 270V032H06 | B-743 | A47-1.5meg-S | QU-139 | TA15L | Vert. Hold |
| B | Shaft | | | Not Req. | ES6-3 | Not Req. | Not Req. | |
| R4A | 100K | ½ | 270V032H02 | B-40 | A47-100K-S | QU-138 | TA15L | Brightness |
| B | Shaft | | | Not Req. | ES6-2 | Not Req. | Not Req. | |
| R5A | 15K | ½ | 270V032H07 | B-20 | A47-15K-S | BU-118 | | Contrast |
| B | Shaft | | | Not Req. | FS-3 | SHI | | |
| R6A | 600Ω | ½ | 270V019H05 | | | | | Quieting |
| B | 5meg | ½ | | | | | | Height |
| C | 500K | ½ | | | | | | Vert. Lin |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | Westinghouse PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R7 | 18meg 5% | | 250V211A86 | |
| R8 | 100K | | 250V222A04 | |
| R9 | 3300Ω | | 250V033H03 | |
| R10 | 3900Ω | | 259V003H02 | |
| R11 | 470Ω | | 250V234A71 | |
| R12 | 47Ω | | 250V234A70 | |
| R13 | 6200Ω | | 250V003H06 | |
| R14 | 470K 5% | | 250V214A74 | |
| R15 | 3900Ω | | 259V003H03 | |
| R16 | 470Ω | | 250V234A71 | |
| R17 | 47Ω | | 250V234A70 | |
| R18 | 470Ω | | 250V234A71 | |
| R19 | 150Ω | | 250V222A51 | |
| R20 | 4300Ω 5% | | 250V214A33 | |
| R21 | 1meg | | 250V221A05 | |
| R22 | 150Ω | | 250V221A51 | |
| R23 | 5600Ω | | 250V225A62 | |
| R24 | 100Ω | | 250V221A01 | |
| R25 | 3300Ω | | 250V223A32 | |
| R26 | 6800Ω | | 250V225A82 | |
| R27 | 5600Ω | | 250V225A62 | |
| R28 | 1800Ω | 1 | 250V321A82 | |
| R29 | 2200Ω | 1 | 250V322A22 | |
| R30 | 15K | | 250V226A55 | |
| R31 | 10K | | 250V221A03 | |
| R32 | 100K | | 250V222A04 | |
| R33 | 220K | | 250V224A24 | |
| R34 | 1meg | | 250V221A05 | |
| R35 | 470K | | 250V224A74 | |
| R36 | 56K | | 250V225A55 | |
| R37 | 470Ω | | 250V234A71 | |
| R38 | 560K | | 250V225A54 | |
| R39 | 8200Ω | 1 | 250V328A22 | |
| R40 | 12K | | 250V222A23 | |
| R41 | 680Ω | | 250V228A81 | |
| R42 | 560Ω | 4 | 251V020H07 | |
| R43 | 120Ω | | 250V221A21 | |
| R44 | 1.5meg 5% | | 250V211A55 | |
| R45 | 470K 5% | | 250V214A74 | |
| R46 | 27K | | 250V222A73 | |
| R47 | 47K | | 250V224A73 | |

| ITEM No. | RATING | | Westinghouse PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R48 | 56K | | 250V235A53 | |
| R49 | 33K | | 250V222A23 | |
| R50 | 39K | | 250V223A33 | |
| R51 | 6800Ω | 2 | 250V436A82 | |
| R52 | 82K | | 250V228A23 | |
| R53 | 27K | | 250V222A73 | |
| R54 | 10K 5% | | 250V211A03 | |
| R55 | 5600Ω | | 250V225A62 | |
| R56 | 100K | | 250V222A04 | |
| R57 | 1meg | | 250V221A05 | |
| R58 | 150Ω | | 250V221A51 | |
| R59 | 68K | | 250V228A53 | |
| R60 | 2.2meg | | 250V222A25 | |
| R61 | 2.2meg | | 250V222A25 | |
| R62 | 1meg | | 250V221A05 | |
| R63 | 560Ω | | 250V225A61 | |
| R64 | 560Ω | | 250V225A61 | |
| R65 | 680K | | 250V228A84 | |
| R66 | 1meg | | 250V221A05 | |
| R67 | 220K | | 250V224A24 | |
| R68 | 15K | | 250V226A53 | |
| R69 | 470K 5% | | 250V214A74 | |
| R70 | 47K | | 250V234A73 | |
| R71 | 27K | 1 | 250V323A93 | |
| R72 | 82K | | 250V228A23 | |
| R73 | 560K | | 250V225A54 | |
| R74 | 10K | | 250V221A03 | |
| R75 | 330K | 1 | 250V323A34 | |
| R76 | 220K | | 259V003H13 | |
| R77 | 100Ω | | 250V221A01 | |
| R78 | 22K | | 250V222A24 | |
| R79 | 150Ω | | 250V221A51 | |
| R80 | 470K 5% | | 250V214A74 | |
| R81 | 560Ω | 2 | 250V435A81 | |
| R82 | 15K | | 250V221A53 | |
| R83 | 2200Ω | | 250V223A22 | |
| R84 | 2.2Ω | | 251V002A29 | |
| R85 | 100K | 1 | 259V003H09 | |
| R86 | 180Ω | 7 | 251V020H12 | |
| R87 | 7.5Ω | | 259V007H02 | |
| R88 | 33Ω | 15 | 251V017H09 | Note 1 |

Note 1. Ch. V-2366-2 uses 29Ω 15W in this application (Part #251V017H10).

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | Westinghouse PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | |
| L1A | 1st Video IF | 235V003H01 | | | | | |
| B | 4i. 25MC Trap | | | | | | |
| L2 | 2nd Video IF | 235V020H01 | | | | | |
| L3 | 47.25MC Trap | 230V030H01 | | | | | |
| L4 | 3rd Video IF | 235V020H01 | | | | | |
| L5 | 4th Video IF | 235V005H01 | | | | | Includes M3 |
| L6 | RF Choke | 230V019H10 | 19-1006 | | 4634 | | 14 Microhenries |
| L7 | Shunt Peaking Coil | 230V034H01 | 19-3330 | TV-190 | 6132 | VP-7 | 350 Microhenries |
| L8 | 4.5MC Trap | 230V030H02 | | | | | |
| L9 | Series Peaking Coil | 230V034H02 | 19-3100 | TV-194 | 6132 | VP-3 | 100 Microhenries |
| L10 | Shunt Peaking Coil | 230V034H01 | 19-3330 | TV-190 | 6132 | VP-7 | 350 Microhenries |
| L11 | 1st Sound IF | 230V030H04 | | | | | |
| L12 | 2nd Sound IF | 230V030H04 | | | | | |
| L13 | Shunt Peaking Coil | 230V034H01 | 19-3330 | TV-190 | 6132 | VP-7 | 350 Microhenries |
| L14 | Quadrature Coil | 230V031H01 | | | | | |
| L15 | RF Choke | 230V019H10 | 19-1006 | | 4634 | | 14 Microhenries |
| L16 | RF Choke | 230V019H10 | 19-1006 | | 4634 | | 14 Microhenries |

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI | SEC. | Westinghouse PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | Thordarson PART No. | |
| L17 | 100Ω | | 230V032H01 | | | | | | Horiz. Freq. |

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | DC RES. | INDUCTANCE @ CURRENT (1000 ~/s) | Westinghouse PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| L18 | .290A | 21Ω | .4 Hy. | 430V032H02 ① | C5037 ② | C-2296 ② | | C-2325 ② | 26C44 ② | C-27X |

① Alternate Part #430V032H01. ② Drill new mounting hole.

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No | USE | REPLACEMENT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Westinghouse PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Rogers PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | Vert. Output | 430V033H03 | | | | | | | | |
| | Alt. Vert. Output | 430V033H02 | | | | | | | | |
| T2 | Yoke-(Horiz. 30MH) (90°) (Vert. 32MH) | 490V004H01M | DF507 ①② | MDF-92 ①② | Y90F19/43 ①② | PCM2045 ①② | DF-16A ①② | Y-16 ①② | Y-41 & NW-8 & C1-4 & YC-1 ② | |
| | Alt. Yoke<br>Rear Cover & Centering Device<br>Yoke Clamp | 490V004H01<br>78V058H01<br><br>768V014H01 | | | | | | | | |
| T3 | Horiz. Output | 493V033H06 | | | | | | | | |

① Requires new rear cover and centering device, and yoke clamp.
② Connect same as original.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | Westinghouse PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T4 | 3100Ω | 3-4Ω | 430V048H01 | | A-3025 | | | 24S48 | S-12X | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP | Westinghouse PART No. | QUAM PART No. | |
| SP1 | 5" | PM | 3-4Ω | 570V045H01 ① | 5A15 | ① Used in Models H-21T217, H-21T203A, H-21TU203A |
| | 6" | PM | 3-4Ω | 570V042H02 ② | | ② Used in Models H-21K204D, H-21K205D |
| | 5" | PM | 3-4Ω | 570V017H01 ③ | | ③ Used in Models H-21T20ID, H-21T202D and some versions of H-21T217 |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | Westinghouse PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K1 | Vert. Integrator | 3000mmf, 5000mmf, 5000mmf, 6200Ω, 6300Ω, 22K | 21SV003H01 | Aerovox<br>Centralab<br>Cornell-Dubilier<br>Sprague | PA-110<br>PC-104<br>115TMU<br>V1/V3 |
| K2 | Chassis Isolation | 1000mmf ④ 1500V, 330K | 21BV004H03 | | |

## RECTIFIERS

| ITEM No. | RATING | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | Westinghouse PART No. | FEDERAL PART No. | GENERAL ELECTRIC PART No. | INTERNATIONAL RECTIFIER PART No. | SARKES TARZIAN PART No. | | |
| M1 | .290A | 295V008H01 ① | HY504 ① | 1N1008 ③ | SD94A ① | M500 ① | | ① Silicon Type. |
| M2 | | 296V004H01 ② | K1615 ② | | SD91 ①④ | | | ② Selenium Type. |
| | | | | | | | | ③ Germanium Type. |
| | | | | | | | | ④ 2 Used |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | Westinghouse PART No. | CBS PART No. | SYLVANIA PART No. | |
| M3 | K-6 * | V-1098-3 | 1N80 | 1N295 | Video Detector (Pigtail)<br>* Some versions may use a 1N295 in this application. |

## MISCELLANEOUS

| ITEM No. | PART NAME | Westinghouse PART No. | NOTES |
|---|---|---|---|
| M4 | Tuner | 470V051H01 | VHF Ch. V-2366-1 |
| | Tuner | 470V051H09 | VHF, with UHF provisions, Ch. V-2366-2 |
| | Tuner | 472V034H01 | UHF Ch. V-2366-2 |
| M5 | Magnet | V-9784-8 | Ion Trap |
| | Printed Board | 350V028H01-D | |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

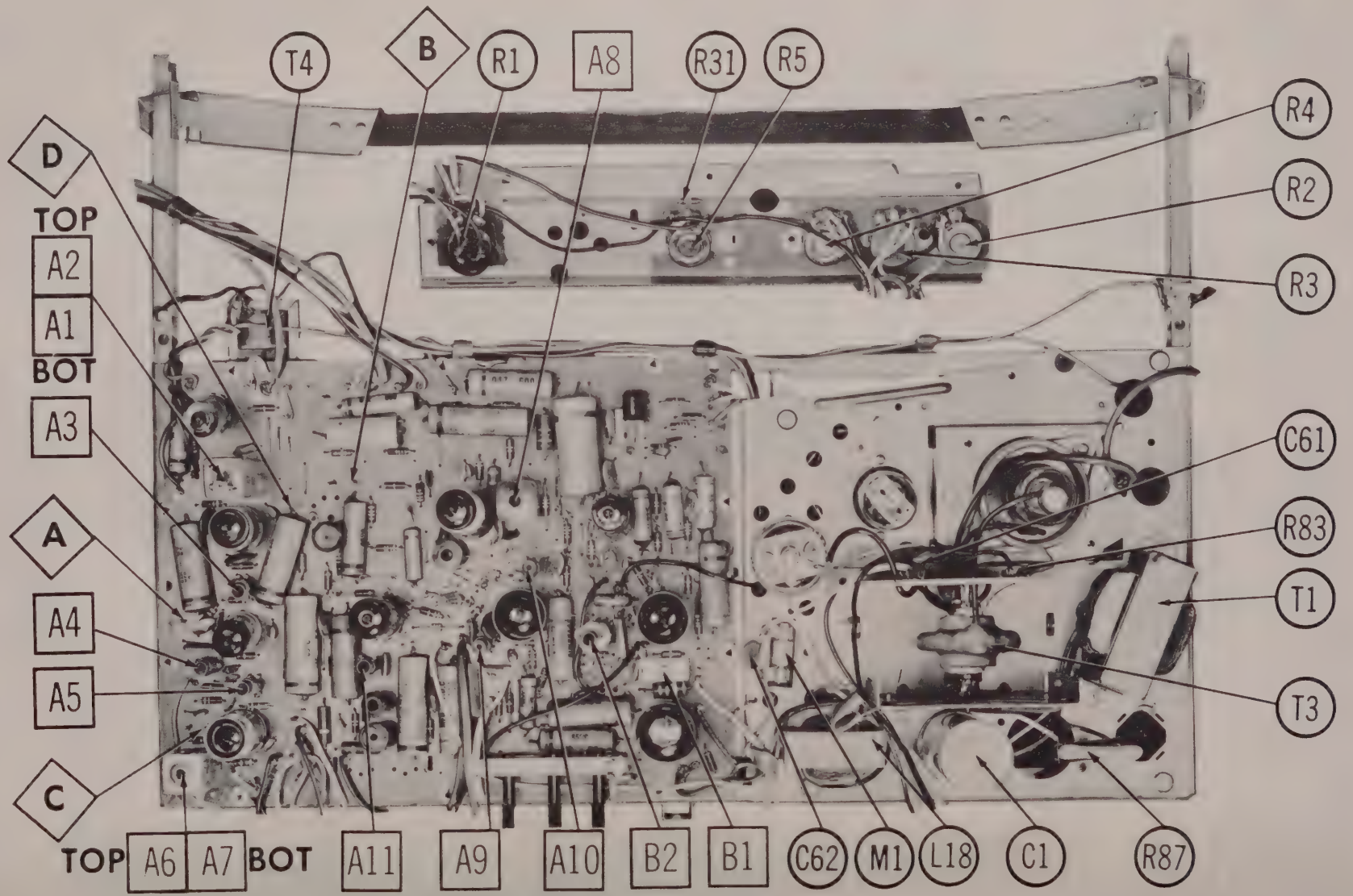
| NAME | PART NO | DESCRIPTION |
|---|---|---|
| Safety Glass | 630V008H03 | Models H-21K204D, H-21K205D, H-21T217 |
| Safety Glass | 630V008H01 | Models H-21T20ID, H-21T202D, H-21T203A, H-21TU203A |
| Mask | 610V007H04 | Models H-21K204D, H-21K205D |
| Mask | 610V007H02 | Models H-21T20ID, H-21T202D |
| Mask | 610V007H03 | Models H-21T203A, H-21TU203A, H-21T217 |
| Knob | 550V046H01 | VHF Channel Selector, Models H-21K204D, H-21K205D, H-21T20ID, H-21T202D |
| Knob | 555V046H01 | VHF Channel Selector, Models H-21T203A, H-21TU203A, H-21T217 |
| Knob | 555V050H01 | UHF Channel Selector |
| Knob | 550V078H01 | VHF Fine Tuning |
| Knob | 550V051H02 | Volume-On-Off, Contrast |
| Knob | 550V044H01 | Brightness, Vert. Hold, Horiz. Hold |

## WIRING DATA

| | |
|---|---|
| High Voltage Lead | Use BELDEN No. [redacted] |
| Shielded Hook-up Wire | Use BELDEN No. 8885 (Single Conductor)<br>8738 (Two Conductor) |
| General-use Unshielded Hook-up Wire | Use BELDEN No. 8530 (Solid) Available in Ten Colors<br>8524 (Stranded) Available in Ten Colors |
| Power Cord (Interlock Type) | Use BELDEN No. [redacted] |
| 300Ω Tuner Input Lead | Use BELDEN No. [redacted] |
| 300Ω Antenna Lead-in | Use BELDEN No. 8230 or 8275 |
| Antenna Rotor Cable | Use BELDEN No. 8464 (Flat) or 8464 (Round) - 4 Conductor<br>8495 (Round) - 5 Conductor<br>8488 (Round) - 8 Conductor |

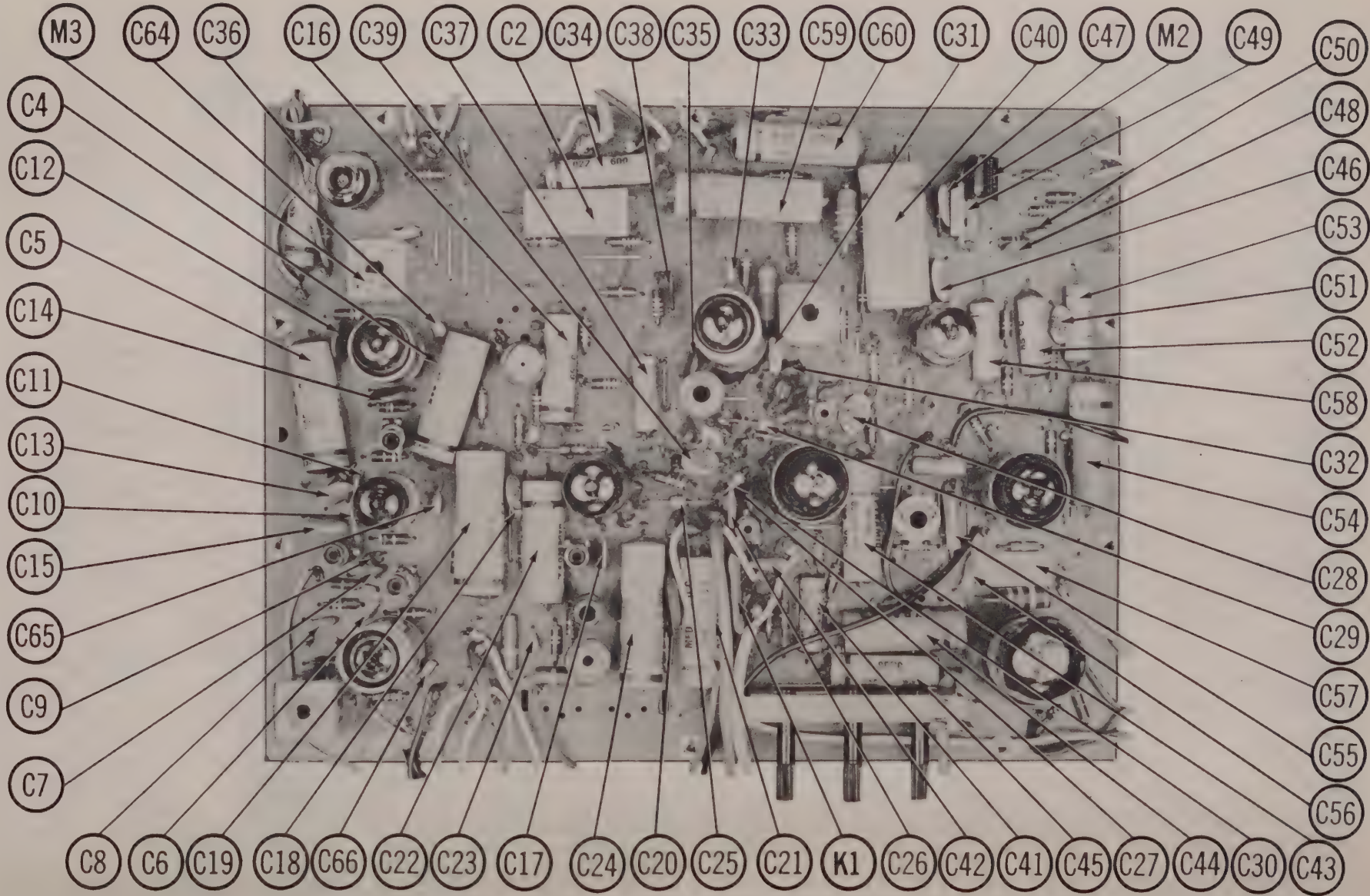
WESTINGHOUSE MODELS H-21K204D, 205D, H-21T201D, 202D, 203A, 217, H-21TU203A (Ch. V-2366-1, -2)

FOLDER 3




CHASSIS TOP VIEW

PRINTED BOARD - RESISTOR & INDUCTOR IDENTIFICATION (R47-R82)




PRINTED BOARD - CAPACITOR & MISC IDENTIFICATION

# TUNER PARTS LIST AND DESCRIPTIONS

## 470V050H01, 472V034H01

## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V201 | RF Amp. | 2BN4 | |
| V202 | Mixer-Osc. | 5CG8 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V203 | UHF Osc. | 2AF4A | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | Westinghouse PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C201 | 30 | | 690V004H18 | | | | | | |
| C202 | 15 | | 215V011A50 | | | | | | 5% |
| C203 | 15 | | 215V011A50 | | DTZ-15 | | | | 5% |
| C204 | 2-8 | | 690V004H69 | | | | | | |
| C205 | 800 | | 690V004H23 | | | | | | |
| C206 | 2-6 | | 690V004H36 | | | | | | |
| C207 | 47 | | 690V004H25 | | | | | | |
| C208 | 800 | | 690V004H23 | | | | | | |
| C209 | 51 | | 690V004H70 | | TCZ-51 | | | | |
| C210 | 2-6 | | 690V004H36 | | | | | | |
| C211 | 1000 | | 690V004H57 | BPD-001 | DD-102 | BYA10D1 | DC521 | 5HK-D1 | |
| C212 | 1 | | 217V001A09 | NPO-SI 1.0 | TCZ-1 | | | | 10% |
| C213 | 10 | | V-19015-1 | | | | | | N470 10% |
| C214 | 10 | | V-19015-1 | | | | | | N470 10% |
| C215 | | | | | | | | | |
| C216 | 1000 | | 690V004H29 | BPD-001 | DD-102 | BYA10D1 | DC521 | 5HK-D1 | |
| C217 | 85 | | 690V004H71 | | | | | | |
| C218 | 800 | | 690V004H23 | | | | | | |
| C219 | 1000 | | 690V004H29 | BPD-001 | DD-102 | BYA10D1 | DC521 | 5HK-D1 | |
| C220 | 800 | | 690V004H23 | | | | | | |
| C221 | 1000 | | 690V004H29 | BPD-001 | DD-102 | BYA10D1 | DC521 | 5HK-D1 | |
| C222 | 800 | | 690V004H23 | | | | | | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | Westinghouse PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R201 | 4700Ω | | 250V224A72 | |
| R202 | 1000Ω | 1 | 250V221A02 | |
| R203 | 10K | | 250V221A03 | |
| R204 | 220K | | 250V222A24 | |
| R205 | 1000Ω | | 250V221A02 | |
| R206 | 10K | | 250V221A03 | |
| R207 | 10K | | 250V221A03 | |

| ITEM No. | RATING | | Westinghouse PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R208 | 5600Ω | | 250V225A62 | |
| R209 | 2700Ω | 1 | | |
| R210 | 3300Ω | | | |
| R211 | 680K | | | |
| R212 | 5600Ω | | | |
| R213 | 100Ω | | | |

## COILS (RF-IF)

| ITEM No. | USE | Westinghouse PART No. | NOTES |
|---|---|---|---|
| L201 | Ant. Input Assy. | 690V004H51 | Includes Input Trans, Trap, K201, K202 |
| L202 | IF Trap Coil | 690V004H38 | |

| ITEM No. | USE | Westinghouse PART No. | NOTES |
|---|---|---|---|
| L203 | RF Choke | 690V004H39 | |
| L204 | Mixer Plate Coil | 690V004H40 | |

## COMPONENT COMBINATIONS

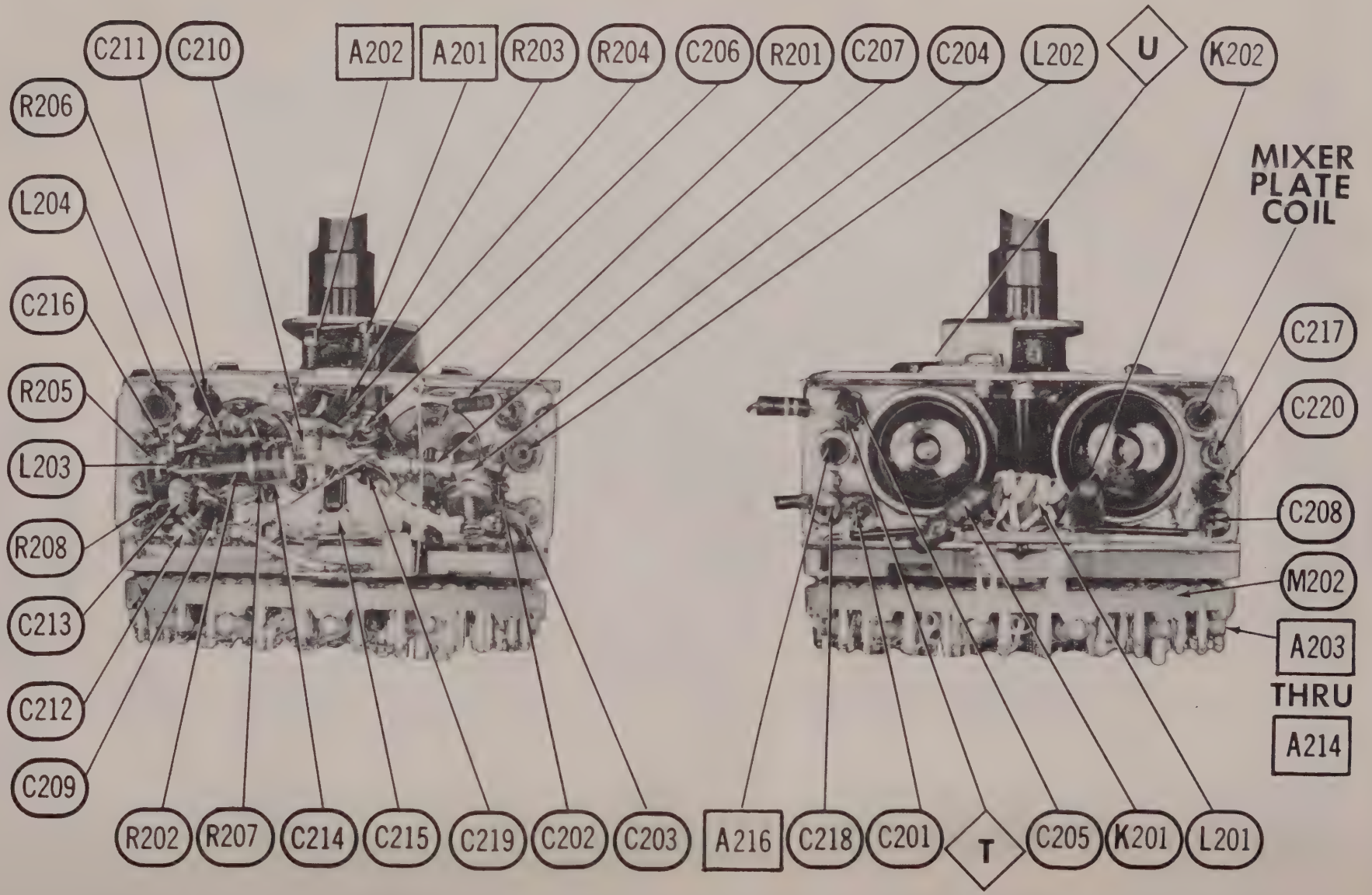
| ITEM No. | USE | DESCRIPTION | Westinghouse PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K201 | Antenna Isolation | 470mmf, .3-1meg | | Centralab | RC-471 |
| | | | | Sprague | R-9177 |
| K202 | Antenna Isolation | 470mmf, .3-1meg | | Centralab | RC-471 |
| | | | | Sprague | R-9177 |

## CRYSTAL DIODES

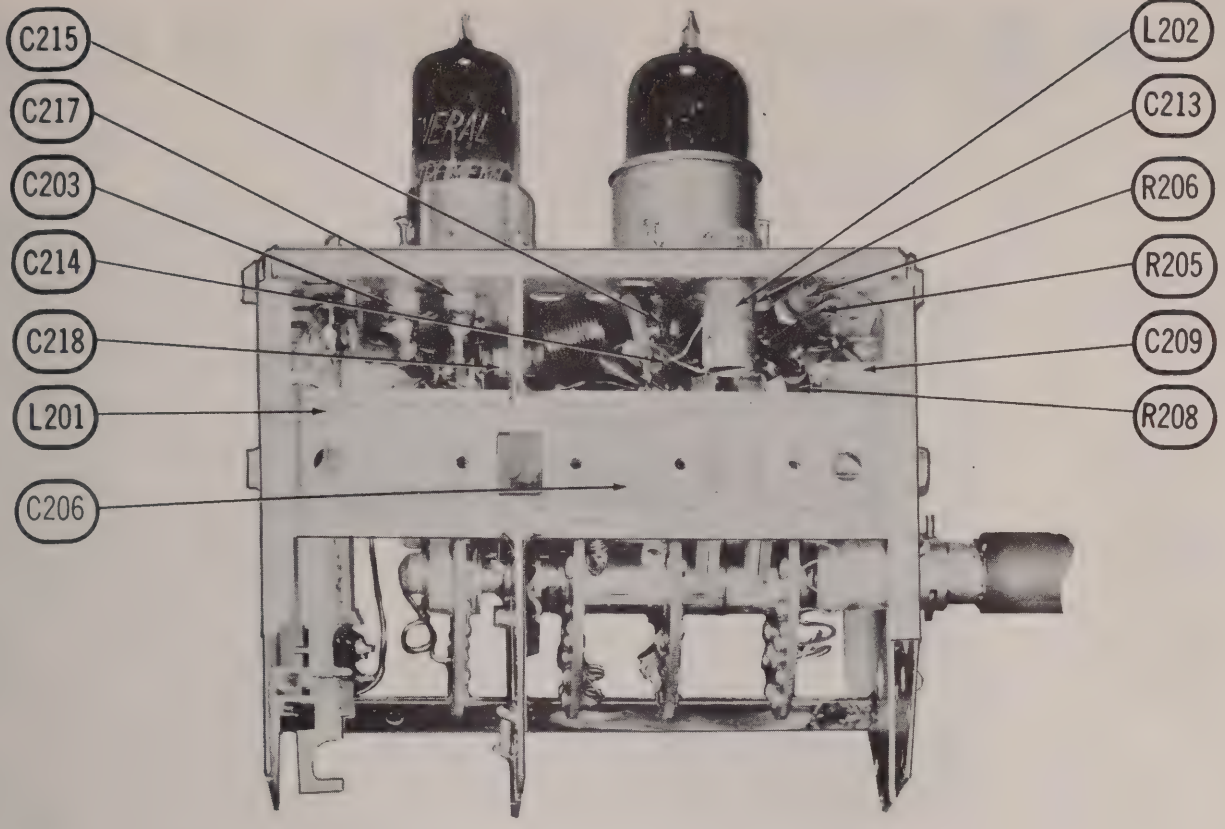
| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | Westinghouse PART No. | CBS PART No. | SYLVANIA PART No. | |
| M201 | 1N82A | V-8634-3 | 1N82A | 1N82A | UHF Mixer (Clip-in) |

## MISCELLANEOUS

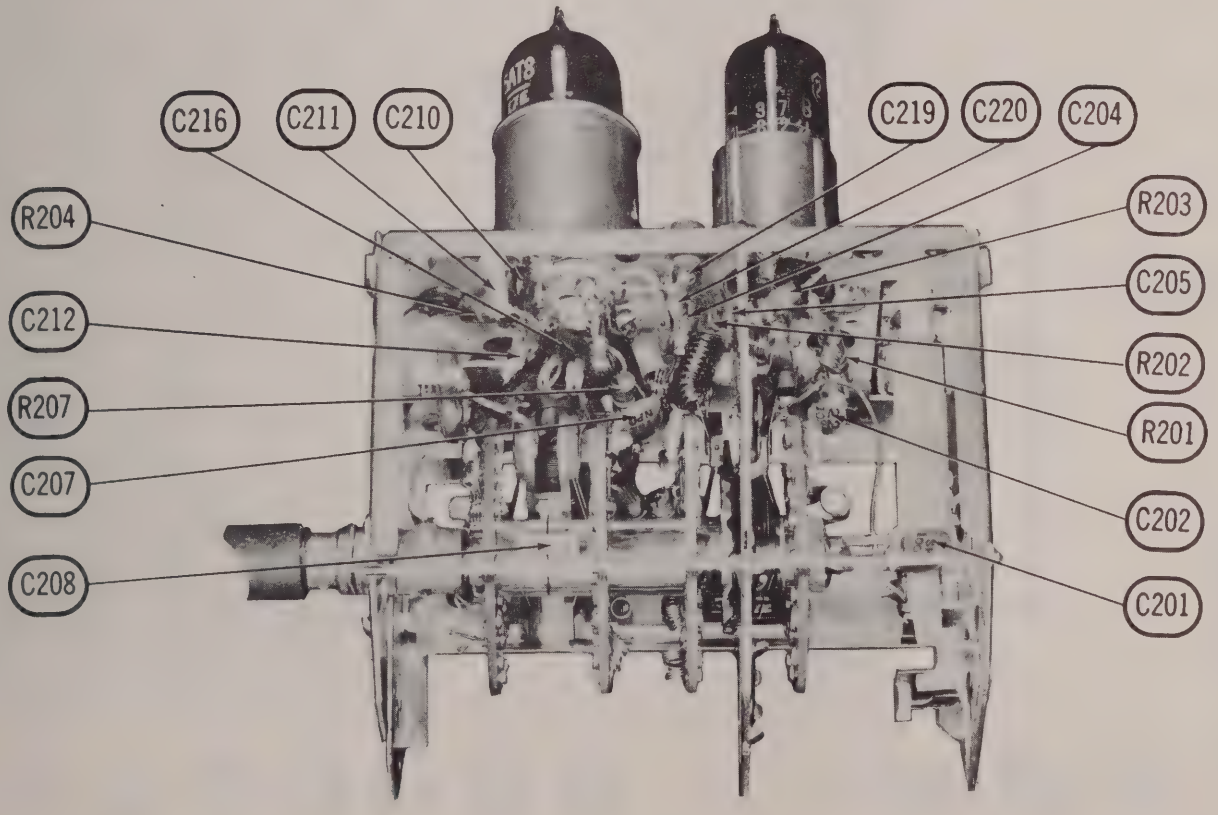
| ITEM No. | PART NAME | Westinghouse PART No. | NOTES |
|---|---|---|---|
| M202 | Rotor Disc | 690V004H68 | Complete Assy. |
| M203 | Rear Cover | 690V004H66 | Tuner #470V050H01 |
| | Rear Cover | 690V004H49 | Tuner #470V049H01 |



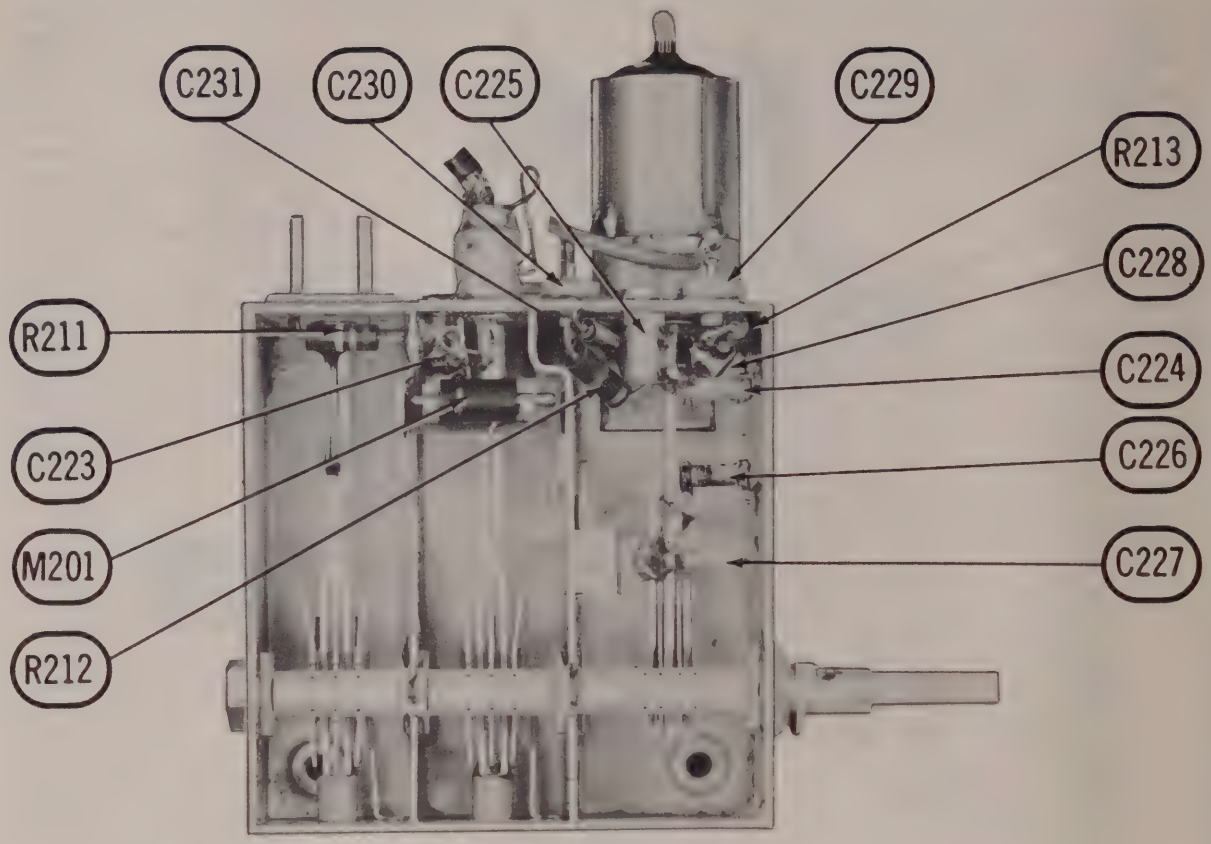

TUNER 470V050H01



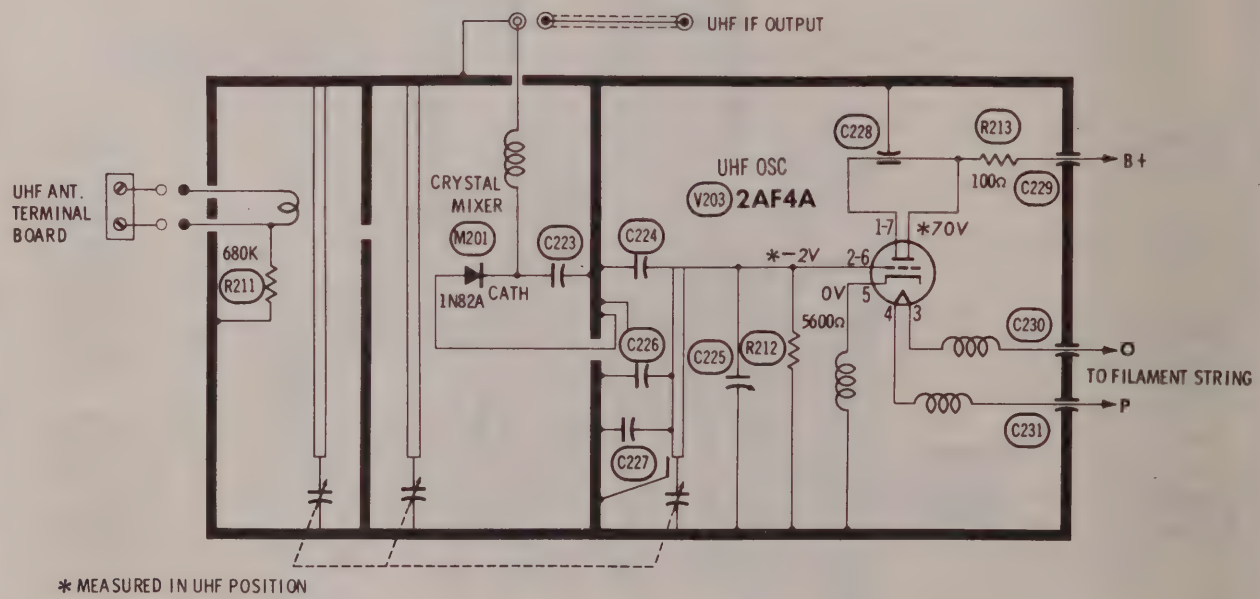

TUNER 470V051H01 - LEFT SIDE




TUNER 470V051H01 - RIGHT SIDE




TUNER 472V034H01




A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

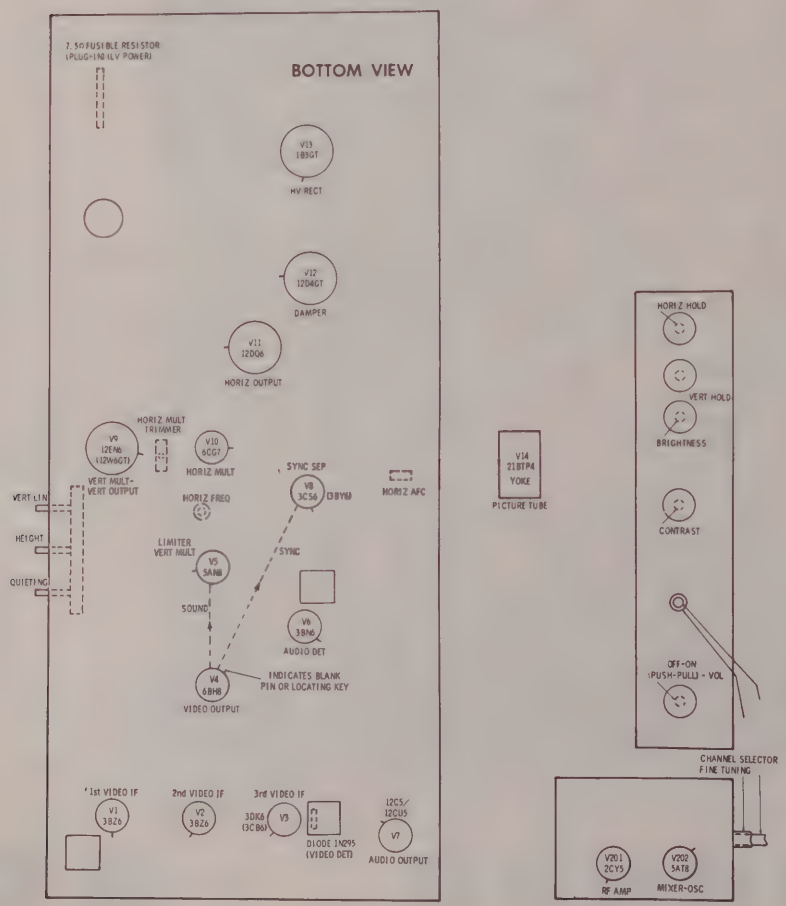
UHF TUNER 472V034H01

# RESISTANCE MEASUREMENTS

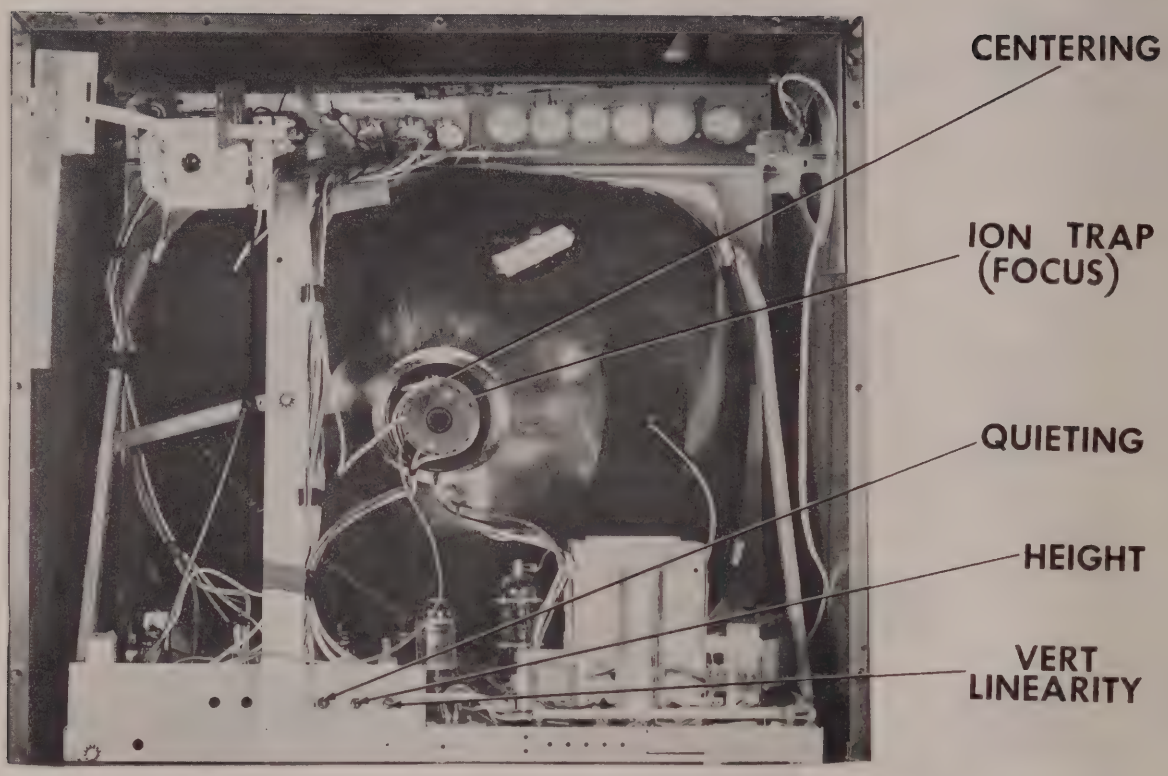
| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 3BZ6 | 480K | 47Ω | 5.5Ω | 6.5Ω | †650Ω | †650Ω | 0Ω | | |
| V2 | 3BZ6 | 480K | 47Ω | 6.5Ω | 7.5Ω | †650Ω | †650Ω | 0Ω | | |
| V3 | 3DK6 | .1Ω | 150Ω | 7.5Ω | 8.5Ω | †650Ω | †650Ω | 0Ω | | |
| V4 | 6BH8 | 100Ω | ● 6000Ω | †5600Ω | 11Ω | 12.5Ω | 150Ω | 1meg | †180Ω | †4100Ω |
| V5 | 5AN8 | ● ǂ3.3meg | ● 1.2meg | 5000Ω | 15Ω | 13.5Ω | †56K | †56K | 470K | 0Ω |
| V6 | 3BN6 | ● 230Ω | 13Ω | 12.5Ω | 13.5Ω | †8400Ω | 7.5Ω | ǂ560K | | |
| V7 | 12C5/ 12CU5 | 120Ω | 0Ω | 8.5Ω | 11Ω | 0Ω | †1200Ω | †850Ω | | |
| V8 | 3CS6 | 27K | 0Ω | 15Ω | 16Ω | †35K | †7000Ω | 2meg | | |
| V9 | 12EN6 | NC | 16Ω | †175Ω | †48Ω | ● 1.4meg | NC | 18Ω | 0Ω | |
| V10 | 6CG7 | †200K | ● 250K | 1000Ω | 0Ω | 2Ω | †39K | 2.5meg | 1000Ω | 0Ω |
| V11 | 12DQ6 | NC | 18Ω | NC | †560Ω | 470K | NC | 20Ω | .5Ω | TOP CAP ǂ11Ω |
| V12 | 12D4GT | NC | NC | ¶300K | NC | †1Ω | NC | 20Ω | 22Ω | |
| V13 | 1B3GT | PINS 1 THRU 8 HAVE INFINITE RESISTANCE | | | | | | | | TOP CAP ǂ730Ω |
| V14 | 21BTP4 | 2Ω | 100K | Pin 6 †180Ω | Pin 10 ǂ1meg | Pin 11 ● 270K | Pin 12 3.5Ω | | | |
| V201 | 2CY5 | 580K | 0Ω | 3.5Ω | 4Ω | †180Ω | †13K | 0Ω | | |
| V202 | 5AT8 | 15K | †4900Ω | 0Ω | 4Ω | 5.5Ω | †2000Ω | †180Ω | 0Ω | 100K |
| ITEM | Tube | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 135V SOURCE.
ǂ MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION.
TP TIE POINT.




# TUBE PLACEMENT CHART




## CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Connect a clip lead across the Horizontal Frequency coil (L17). This may be done from the top of the chassis.

Set the Horizontal Hold (R2) to the center of its range.

Connect the DC probe of a VTVM to pin 7 (grid) of Horizontal Multivibrator (V1). Common to chassis.

With the reciever tuned to a TV signal, adjust the Horizontal Multivibrator Trimmer (B1) for zero reading on the VTVM. If zero can be approached, but not quite reached at one extreme of B1, it may be necessary to set the Horizontal Hold SLIGHTLY to one side of mid-range to obtain zero reading on the VTVM.

Remove the clip lead from L17.

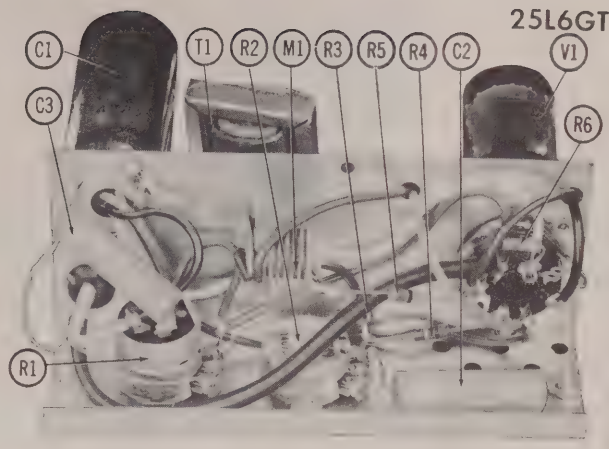
Adjust the Horizontal Frequency slug (B2) for zero reading on the VTVM and check the adjusment by switching off channel and back again. The receiver should pull into synchronization on all channels. If not, repeat adjustments.

PHOTOFACT* Folder

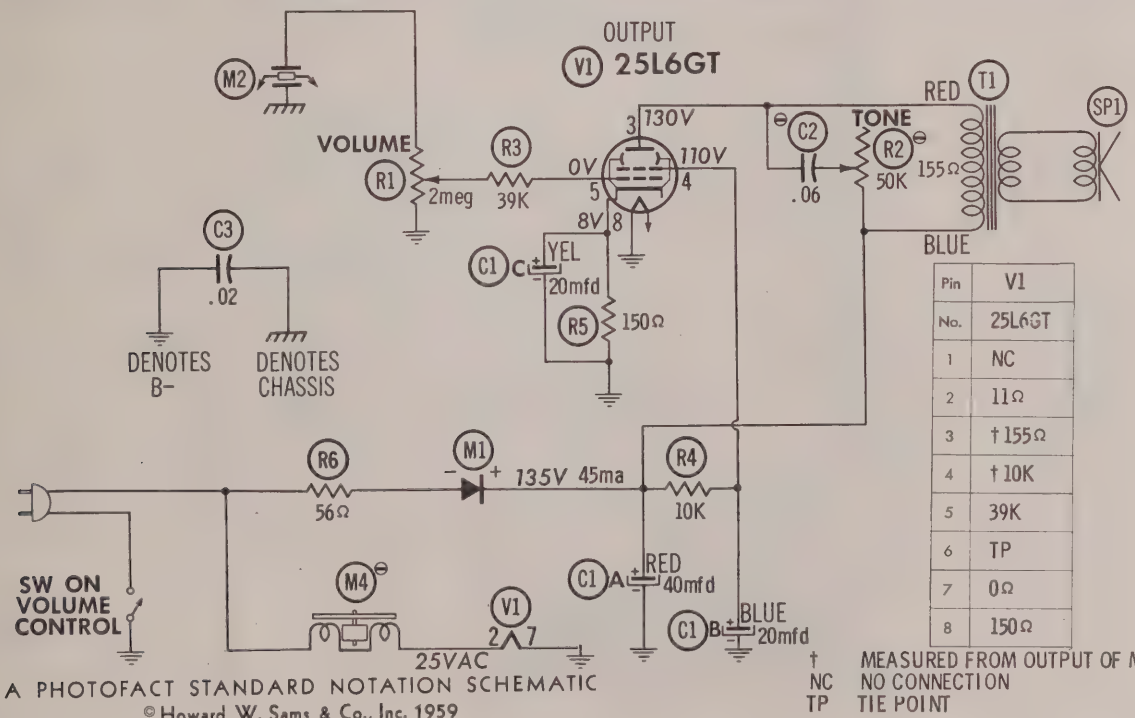
# AIRLINE MODELS JWR-867A, -886A, -904A, -909A, -918A

AIRLINE MODELS JWR-867A, -886A, -904A, -909A, -918A

MODEL JWR-909A




| | |
|---|---|
| TRADE NAME | Airline Models JWR-867A, JWR-886A, JWR-904A, JWR-909A, JWR-918A |
| SUPPLIER | Montgomery Ward & Co., 619 Chicago Ave., Chicago, Illinois |
| TYPE SET | AC Operated One Tube Phono Amplifier With 4 Speed Manual Record Player |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycles RATING 32 Watts, .33 Amp. @ 117 Volts AC (Less Motor) |




| Pin No. | V1 25L6GT |
|---|---|
| 1 | NC |
| 2 | 11Ω |
| 3 | †155Ω |
| 4 | †10K |
| 5 | 39K |
| 6 | TP |
| 7 | 0Ω |
| 8 | 150Ω |

† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H944



SET 439 FOLDER 4

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Output | 25L6GT | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| | | | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | AIRLINE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
| C1A | 40 | 150 | 12144 | PRS150/25V | BBRT4215C | | TDLT-12 | FMT-321 | TVA-3423 |
| B | 20 | 150 | | 4020/20 | | | | | |
| C | 20 | 25 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | TOL | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | | AIRLINE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | .06 | 200 | | | P288N-06 | | CUB6S6 | GEM-416 | 6TM-S6 | ① |
| C3 | .02 | 200 | | | P288N-02 | | CUB2S2 | GEM-412 | 2TM-S2 | |

① Not used in Models JWR-867A, JWR-886A

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES | |
|---|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | AIRLINE PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | | |
| R1A | 2meg | ½ | 11748 | B-76 | A47-2meg-Z | Q13-139 | U55 | Volume | |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | | |
| C | Switch | | | KB-1 or KR-1* | SWE-12 | 76-1 | US-26 | | |
| R2A | 50K | ½ | 11749 | B-32 | A47-50K-Z | Q13-123 | U33 | Tone | Note 1 |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | | |

* Use KR with CRL "Red Label" Controls and KB with "Blue Label" Controls.
Note 1. Tone Control not used in Models JWR-867A & JWR-886A.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | AIRLINE PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R3 | 39K | | | |
| R4 | 10K | | | |

| ITEM No. | RATING | | AIRLINE PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R5 | 150Ω | | | |
| R6 | 56Ω | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | AIRLINE PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2600Ω | 3-4Ω | Part of SP1 | Z1101 | A-3025 | AU-605 | A-3332 | 24S53 | S-12X | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | AIRLINE PART No. | QUAM PART No. | |
| SP1 | 4" | PM | 3-4Ω | 11752 ① | 4A07 | ① Includes T1 |

## SELENIUM RECTIFIER

| ITEM No. | RATING | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | CURRENT (Measured) | AIRLINE PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | |
| M1 | .047A | 11756 | 1234AH | T065<br>SD-94 ① | 65<br>K200 ① | ① Silicon Type |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | AIRLINE PART No. | ASTATIC PART No. | | JENSEN PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | NEEDLE | |
| M2 | 60-57 | 310TS<br>* B310-T | N8-1 & N8-3 | 6 | CRA-55 and CRA-55LP or CRA-55D and CRA-55LPD | Models JWR-909A,-918A<br>* Tone Arm complete with Cartridge |
| | 60-39 | 106<br>* W-106 | N6-2 | | | Models JWR-867A,-886A,-904A<br>* Tone Arm complete with Cartridge |

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

| ITEM No. | REPLACEMENT DATA | | | REMARKS |
|---|---|---|---|---|
| | AIRLINE PART No. | JENSEN PART No. | WALCO PART No. | |
| M3 | 61-48 (78) | † CRA-55 or<br>♦ CRA-55D | † W-64S or<br>♦ W-64D | Models JWR-909A,-918A |
| | 61-47 (LP) | † CRA-55LP or<br>♦ CRA-55LPD | † W-64MGS or<br>♦ W-64MGD | |
| | 61-43 | * W-122 or<br>† W-132 or<br>♦ W-132D | * W-40AGA | Models JWR-867A,-886A,-904A |

* Metal  † Jewel  ♦ Diamond

## MISCELLANEOUS

| ITEM No. | PART NAME | AIRLINE PART No. | NOTES |
|---|---|---|---|
| M4 | Motor | 12704 | 4 Speed, Models JWR-909A, JWR-918A |
| | Motor | 12615 | 3 Speed, Models JWR-867A, JWR-886A, JWR-904A |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 12128-8E | On-Off-Volume, Tone; Models JWR-909A, JWR-918A |
| Knob | 12126-2E | On-Off-Volume, Tone; Models JWR-867A, JWR-886A, JWR-904A |

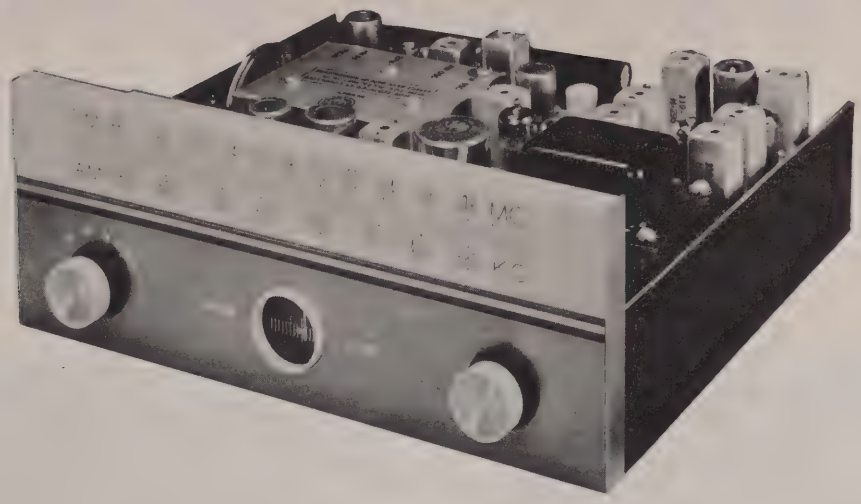
## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

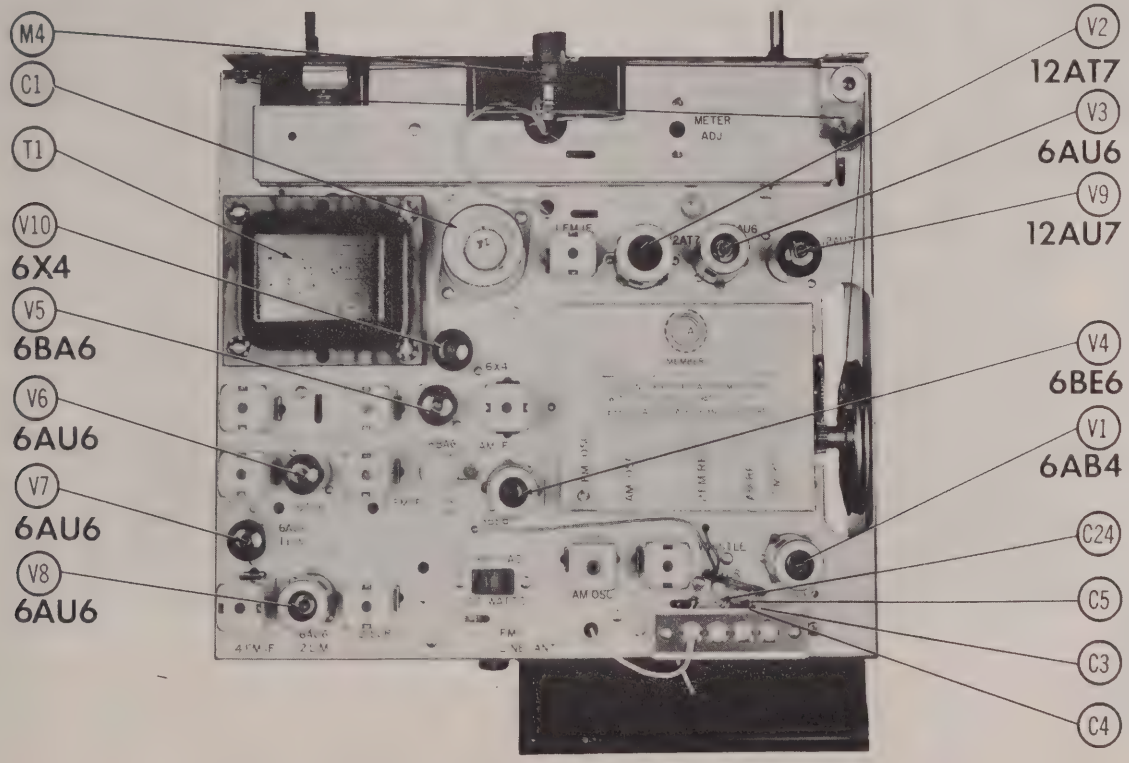
PHOTOFACT* Folder

**DAVID BOGEN
MODEL T661**

DAVID BOGEN
MODEL T661



| | | | |
|---|---|---|---|
| TRADE NAME | David Bogen Model T661 | | |
| MANUFACTURER | David Bogen Co., P. O. Box 500, Paramus, N. J. | | |
| TYPE SET | AC Operated FM-AM Tuner | | |
| TUBES | Ten | | |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles | RATING | 46 Watts, .48 Amp. @ 117 Volts AC |
| TUNING RANGE - BROADCAST | 530-1640KC | FREQ. MOD. | 88 - 108MC |

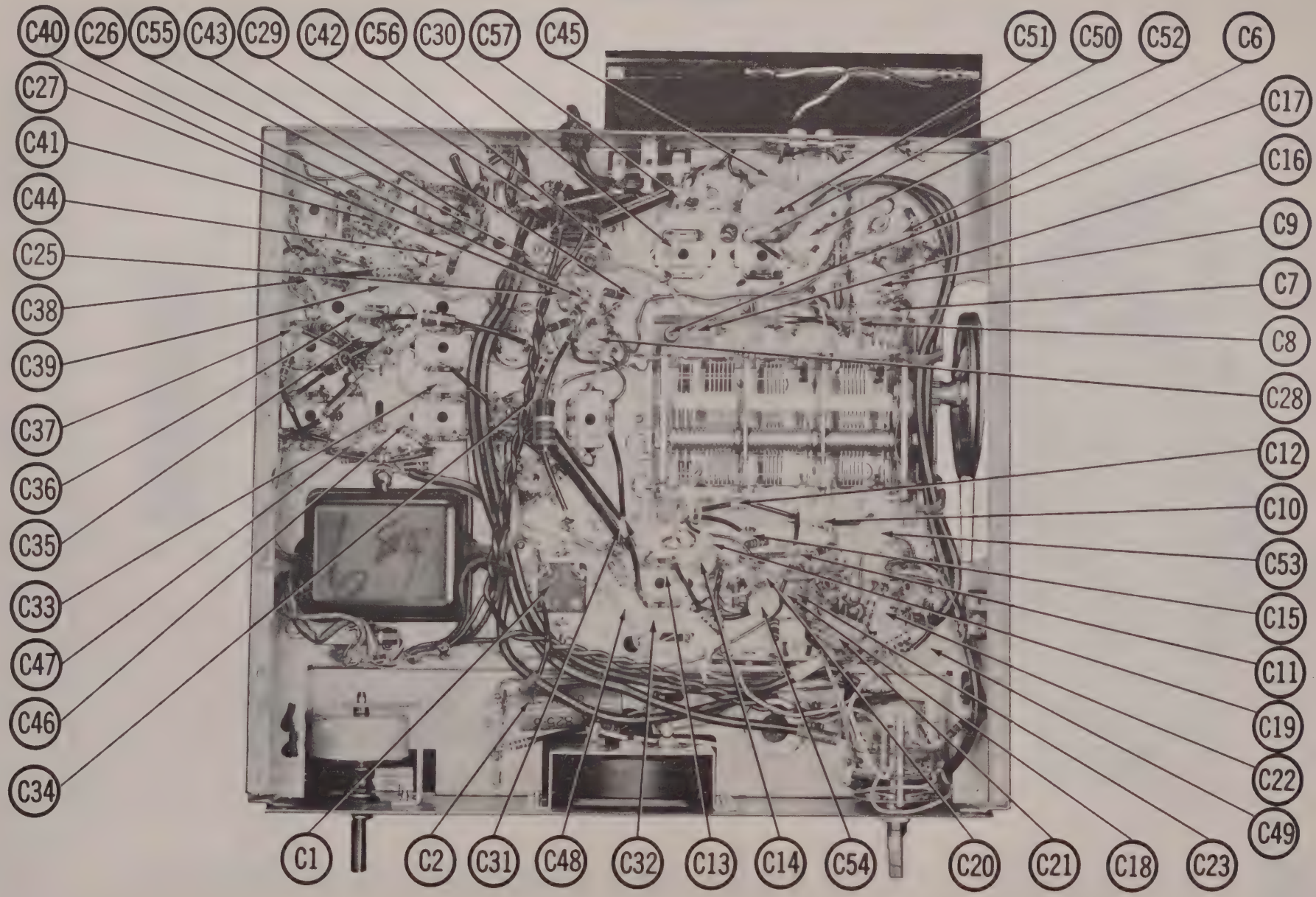



DAVID BOGEN
MODEL T661

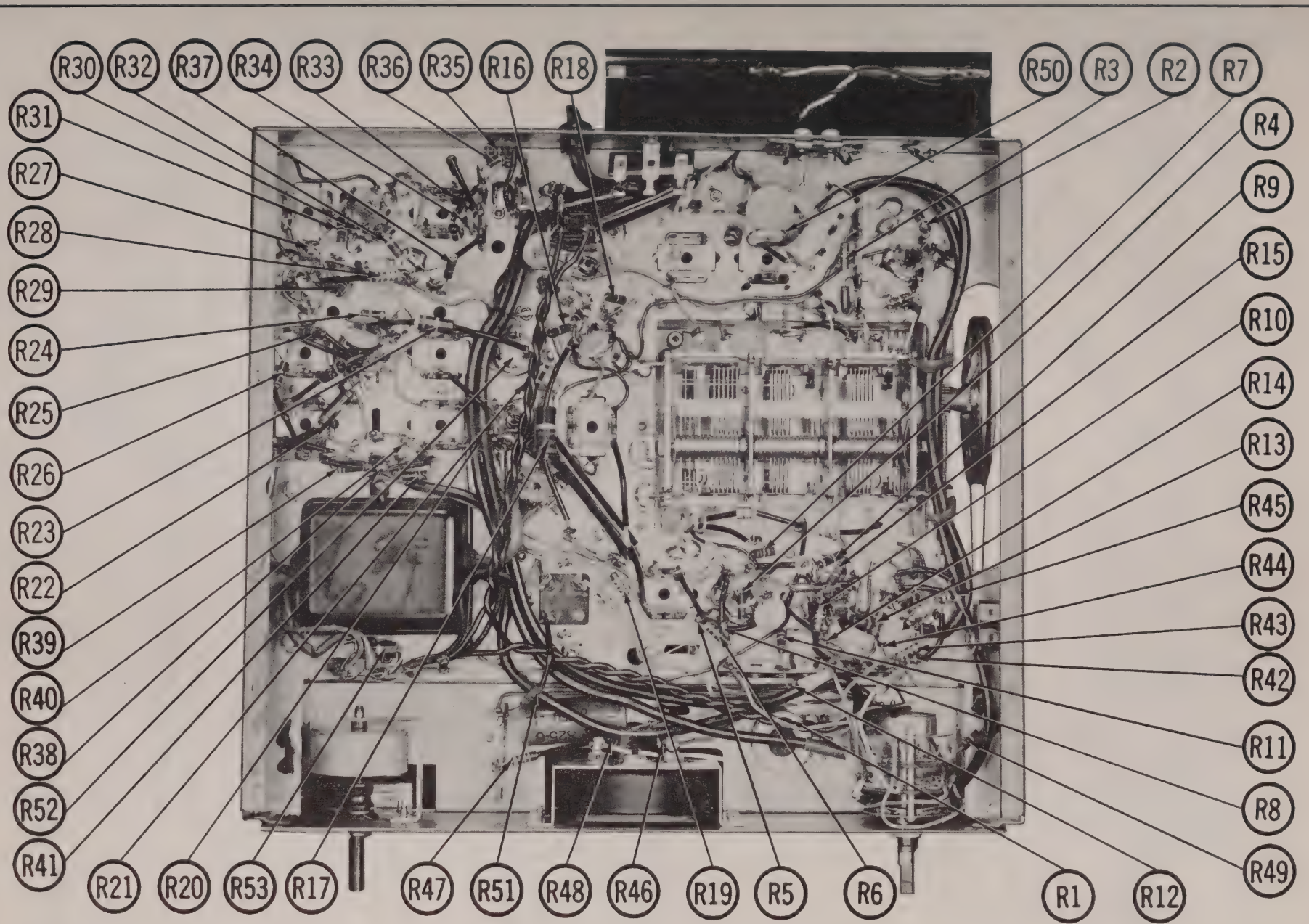
**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H932

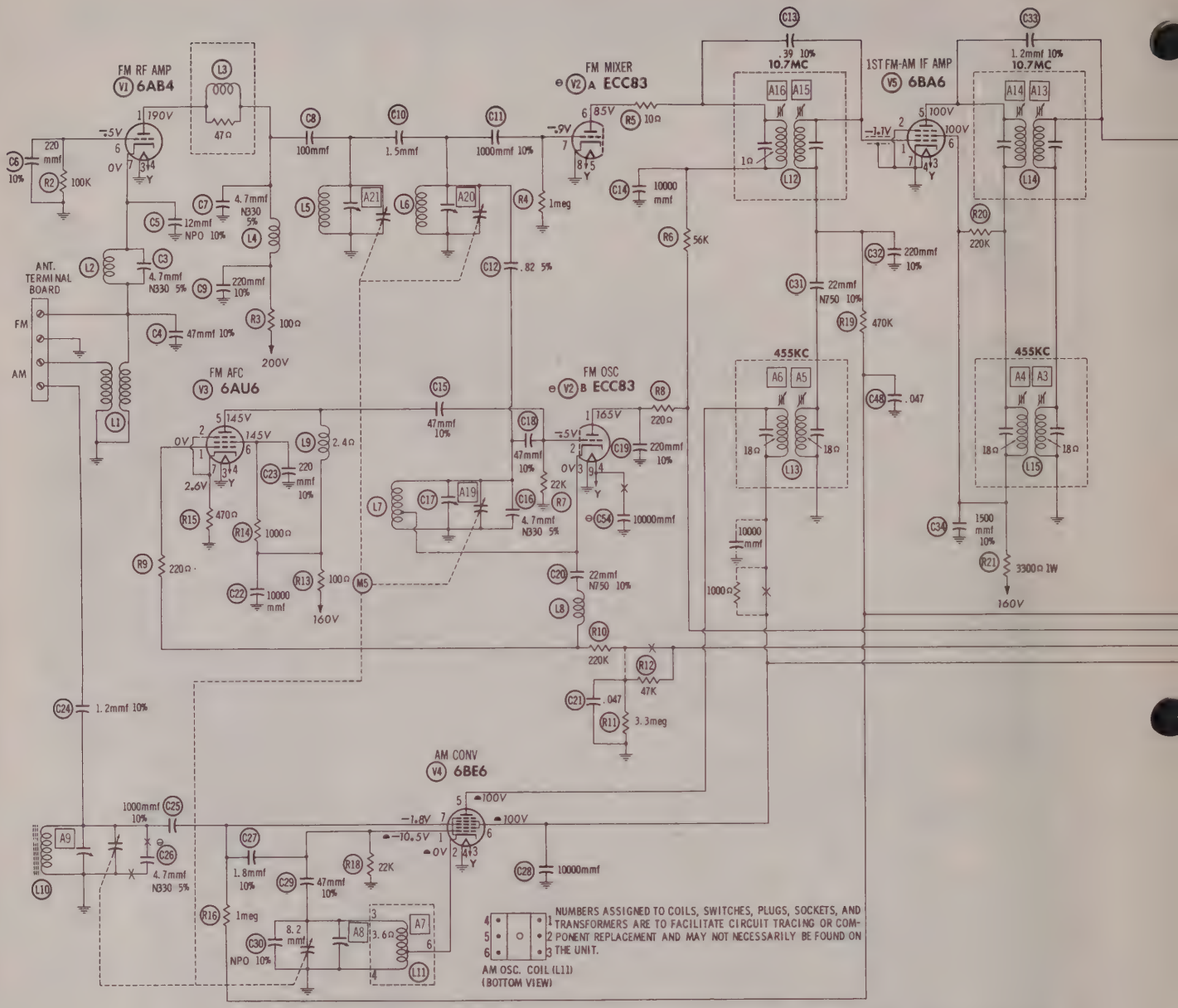



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

DAVID BOGEN
MODEL T661




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AB4 | †600Ω | 0Ω | 0Ω | .1Ω | 0Ω | 100K | 0Ω | | |
| V2 | ECC81 12AT7 | †2900Ω | 22K | 0Ω | .1Ω | .1Ω | †58K | 1meg | 0Ω | 0Ω |
| V3 | 6AU6 | 500K ■ 220K | 470Ω | 0Ω | .1Ω | †1600Ω | †2600Ω | 470Ω | | |
| V4 | 6BE6 | 22K | .4Ω | .1Ω | 0Ω | †▲ 10K | †▲ 10K | 4.5meg | | |
| V5 | 6BA6 | 4meg | 0Ω | .1Ω | 0Ω | †4800Ω | †4800Ω | 0Ω | | |
| V6 | 6AU6 | 19Ω | 0Ω | .1Ω | 0Ω | †6200Ω | †6200Ω | 68Ω | | |
| V7 | 6AU6 | 82K | 0Ω | .1Ω | 0Ω | †20K | †20K | 0Ω | | |
| V8 | 6AU6 | 100K | 0Ω | .1Ω | 0Ω | †100K | †100K | 0Ω | | |
| V9 | ECC82 12AU7 | †1500Ω | 480K | 9200Ω | 0Ω | 0Ω | †1500Ω | 1meg | 800Ω | .1Ω |
| V10 | 6X4 | 163Ω | NC | .1Ω | 0Ω | NC | 168Ω | ¶ | | |

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▲ MEASURED IN "AM" POSITION
† MEASURED FROM PIN 7 OF V10.
▲ MEASURED FROM PIN 3 OF V9.
■ MEASURED IN "FM-AFC" POSITION.
NC NO CONNECTION

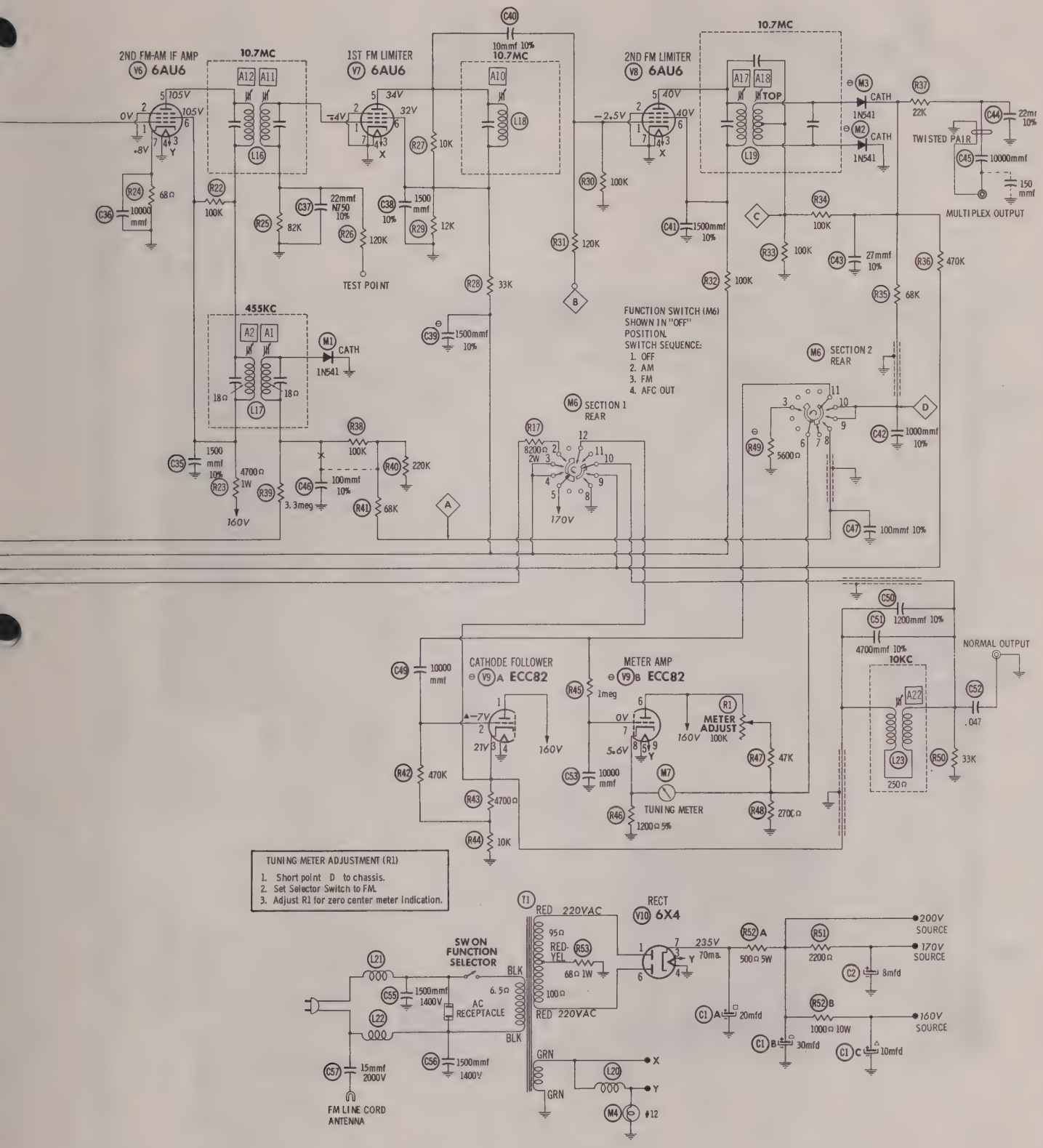
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

**Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION**

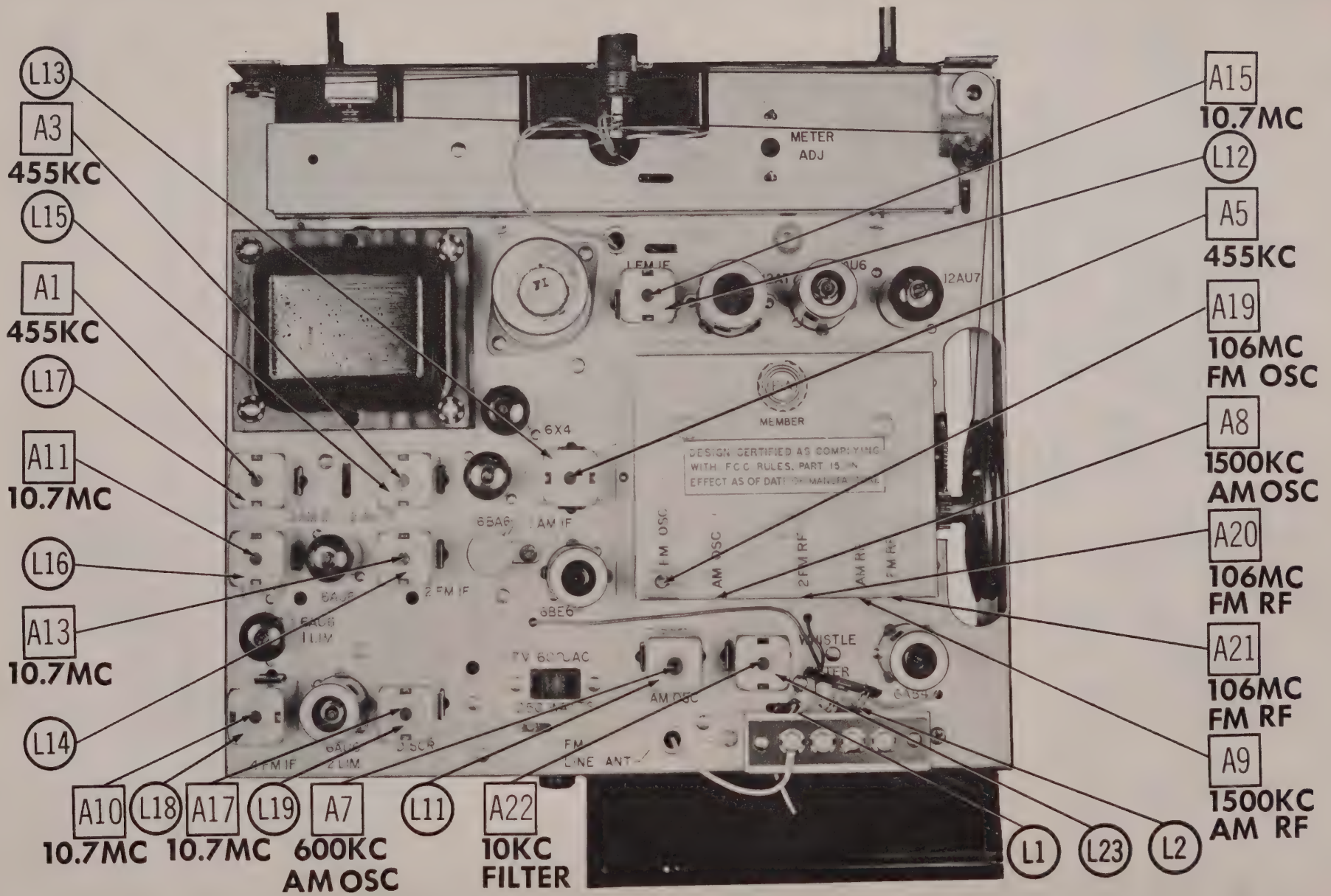
**DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM**

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959




DAVID BOGEN
MODEL T661




CHASSIS-TOP VIEW INDUCTOR AND ALIGNMENT IDENTIFICATION

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1 thru A6, A10 thru A18, A22....GENERAL CEMENT #5097, 8727
A7.....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2543, 2544, 2545
A8, A9, A20, A21.....GENERAL CEMENT #5000, 5003, 5009, 8276, 8290
WALSCO #2515, 2520, 2523, 2525, 2537
A19.....GENERAL CEMENT #5009, 8271, 8275, 8276, 8721, 8722, 9150, 9298
WALSCO #2516, 2519

AM ALIGNMENT

FIG. 1

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .01mfd | High side to pin 7 (grid) of 6BE6 (V4). Low side to chassis. | 455KC (400~ Mod.) | AM (Normal) | Tuning gang fully open | DC probe to point (A). Common to chassis. | A1, A2, A3, A4, A5, A6 | Adjust for maximum deflection. |
| 2. | | High side to AM antenna terminal. Low side to chassis. | 600KC | " | 600KC | DC probe to point (A). Common to chassis. | A7 | " |
| 3. | | " | 1500KC | " | 1500KC | " | A8, A9 | Adjust for maximum deflection. Repeat steps 2 & 3. |

FM IF ALIGNMENT USING AM SIGNAL GENERATOR & VTVM

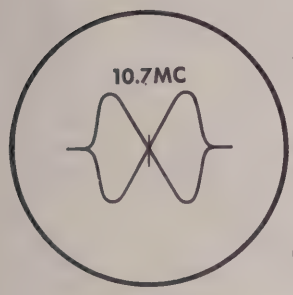


FIG. 2

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .01mfd | High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (Unmod.) | FM | Point of non-interference | DC probe to point (B). Common to chassis. | A10, A11, A12, A13, A14, A15, A16 | Adjust for maximum deflection. |
| 5. | " | " | " | " | " | DC probe thru 1meg to point (C). Common to chassis. | A17 | " |
| 6. | " | " | " | " | " | DC probe to point (D). Common to chassis. | A18 | Adjust for zero reading. A positive & negative reading will be obtained on either side of the setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR & OSCILLOSCOPE

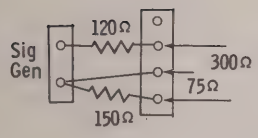


FIG.3

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .01mfd. | High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (450KC SWP) | FM | Point of non-interference | Vert. Amp. to point (B). Low side to chassis. | A10, A11, A12, A13, A14, A15, A16 | Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. |
| 5. | " | " | " | " | " | Vert. Amp. thru 27K to point (C). Low side to chassis. | A17 | " |
| 6. | " | " | " | " | " | Vert. Amp. to point (D). Low side to chassis. | A18 | Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A17 for maximum amplitude and straightness of crossover lines. |

FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 7. | Fig. 3 | Thru dummy to FM antenna terminals. | 106MC (Unmod.) | FM | 106MC | DC probe thru 100K to point (B). Common to chassis. | A19, A20, A21 | Short AFC to chassis. Adjust for maximum deflection in order given. |
| 8. | " | " | 90MC | " | 90MC | " | | Short AFC to chassis. Check for tracking. |

10KC WHISTLE FILTER ADJUSTMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 9. | .01mfd. | High side to pin 2 (grid) of 12AU7 (V9). Low side to chassis. | 10KC | AM | Point of non-interference | AC probe to normal output jack. Common to chassis. | A22 | Adjust for MINIMUM output. |

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | FM RF Amplifier | 6AB4 | |
| V2 | FM Mixer-FM Osc. | ECC81/12AT7 | |
| V3 | FM AFC | 6AU6 | |
| V4 | AM Converter | 6BE6 | |
| V5 | 1st FM-AM IF Amp. | 6BA6 | |
| V6 | 2nd FM-AM IF Amp. | 6AU6 | |
| V7 | 1st FM Limiter | 6AU6 | |
| V8 | 2nd FM Limiter | 6AU6 | |
| V9 | Cath. Follower-Meter Amp | ECC82/12AU7 | |
| V10 | Rectifier | 6X4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA David Bogen PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ■20 | 350 | C-536 | | B0420 | FP376.6 | | TVLS-3639.11* | |
| B | ▲30 | 350 | | | BR2035 | TC62 | | | |
| C | ▲10 | 350 | | | | | | | |
| C2 | 8 | 250 | | PRS250V8 | BBR8-250 | TC51 | TD-8-250 | TVA-1503 | |

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA David Bogen PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C3 | 4.7 | | N330 5% | | | | | | | |
| C4 | 47 | | 10% | | DI 47 | DD-470 | L10Q47 | CNO-447 | 5TCC-Q47 | |
| C5 | 12 | | NPO 10% | | | TCZ-12 | C10Q12C | CNO-412 | | |
| C6 | 220 | | 10% | | DI 220 | MD-221 | L10T22 | JL-322 | 5TCC-T22 | |
| C7 | 4.7 | | N330 5% | | | | | | | |
| C8 | 100 | | | | DI 100 | DD-101 | L10T1 | CNO-310 | 5TCC-T1 | |
| C9 | 220 | | 10% | | DI 220 | MD-221 | L10T22 | JL-322 | 5TCC-T22 | |
| C10 | 1.5 | | | | NPO-SI 1.5 | TCZ-1R5 | CTA6V15C | ZT-5515 | 5TCC-V15 | |
| C11 | 1000 | | 10% | | | | | JL-210 | 5HK-D1 | |
| C12 | .82 | | 5% | | | | | | | |
| C13 | .39 | | 10% | | | | | | | |
| C14 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C15 | 47 | | 10% | | DI 47 | DD-470 | L10Q47 | CNO-447 | 5TCC-Q47 | |
| C16 | 4.7 | | N330 5% | | | | | | | |
| C17 | | | | | | | | | | |
| C18 | 47 | | 10% | | DI 47 | DD-470 | L10Q47 | CNO-447 | 5TCC-Q47 | |
| C19 | 220 | | 10% | | DI 220 | MD-221 | L10T22 | JL-322 | 5TCC-T22 | |
| C20 | 22 | | N750 10% | | N750-DI 22 | DTN-22 | C10Q22U | CN7-422 | 5TCU-Q22 | |
| C21 | .047 | 200 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C22 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |

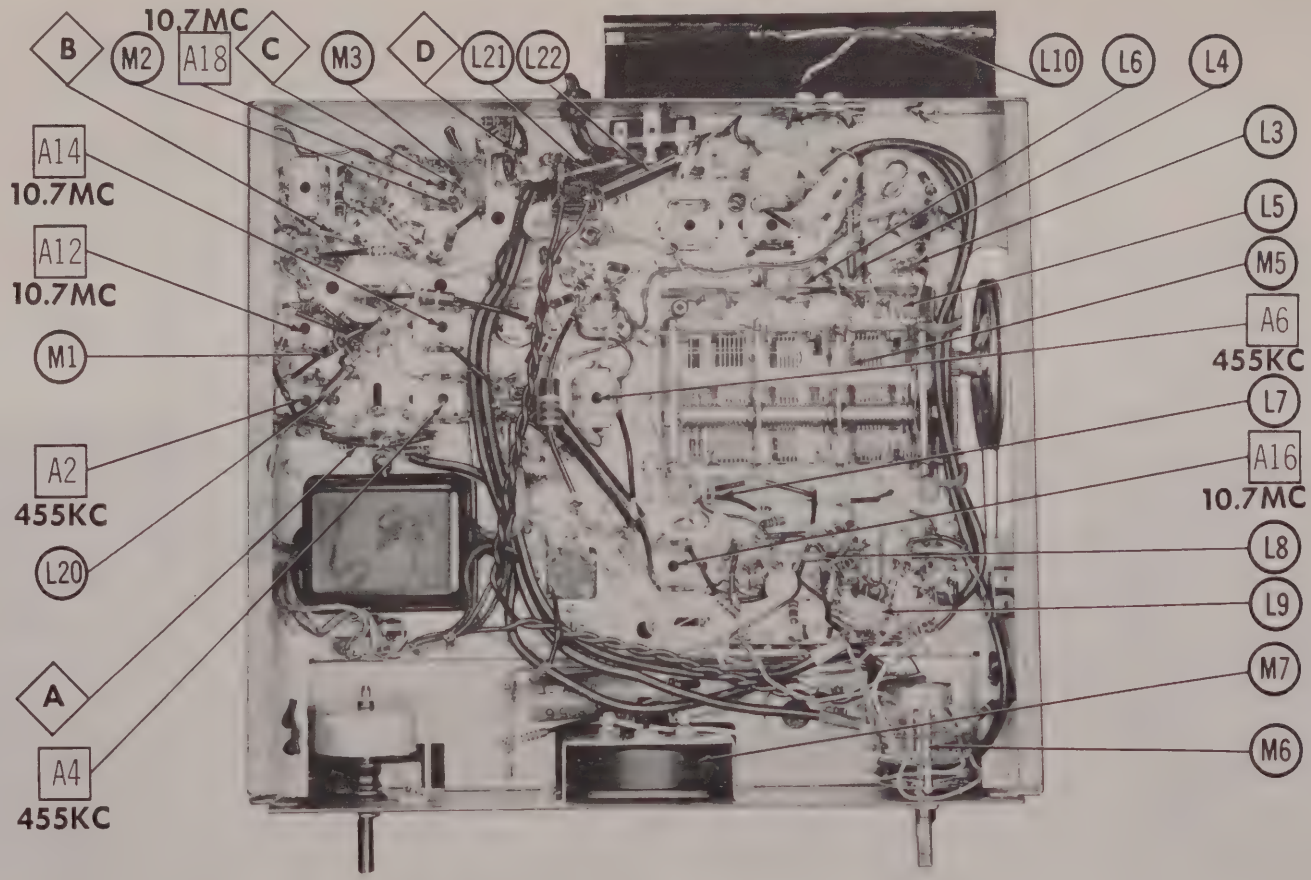
## CAPACITORS (cont)

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA David Bogen PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C23 | 220 | | 10% | | DI 220 | MD-221 | L10T22 | JL-322 | 5TCC-T22 | |
| C24 | 1.2 | | 10% | | | | | | | |
| C25 | 1000 | | 10% | | DI 1000 | | | JL-210 | 5HK-D1 | |
| C26 | 4.7 | | N330 5% | | | | | | | ① |
| C27 | 1.8 | | 10% | | | | | | | |
| C28 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C29 | 47 | | 10% | | DI 47 | DD-470 | L10Q47 | CNO-447 | 5TCC-Q47 | |
| C30 | 8.2 | | NPO 10% | | NPO-DI8.2 | | C10V82C | | | |
| C31 | 22 | | N750 10% | | N750-DI 22 | DTN-22 | C10Q22U | CN7-422 | 5TCU-Q22 | |
| C32 | 220 | | 10% | | DI 220 | MD-221 | L10T22 | JL-322 | 5TCC-T22 | |
| C33 | 1.2 | | 10% | | | | | | | |
| C34 | 1500 | | 10% | | | | | JL-215 | 5HK-D15 | |
| C35 | 1500 | | 10% | | | | | JL-215 | 5HK-D15 | |
| C36 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C37 | 22 | | N750 10% | | N750-DI 22 | DTN-22 | C10Q22U | CN7-422 | 5TCU-Q22 | |
| C38 | 1500 | | 10% | | | | | JL-215 | 5HK-D15 | |
| C39 | 1500 | | 10% | | | | | JL-215 | 5HK-D15 | ② |
| C40 | 10 | | 10% | | NPO-DI 10 | DD-100 | L10Q1 | CNO-410 | 5TCC-Q1 | |
| C41 | 1500 | | 10% | | | | | JL-215 | 5HK-D15 | |
| C42 | 1000 | | 10% | | | | | JL-210 | 5HK-D1 | |
| C43 | 27 | | NPO 10% | | NPO-DI 27 | DTZ-27 | C10Q27C | CNO-427 | | |
| C44 | 22 | | N750 10% | | N750-DI 22 | DTN-22 | C10Q22U | CN7-422 | 5TCU-Q22 | |
| C45 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C46 | 100 | | 10% | | NPO-DI 100 | DD-101 | L10T1 | CNO-310 | 5TCC-T1 | |
| C47 | 100 | | 10% | | NPO-DI 100 | DD-101 | L10T1 | CNO-310 | 5TCC-T1 | |
| C48 | .047 | 200 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C49 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C50 | 1200 | | 10% | | | | | JL-212 | 5GA-D12 | |
| C51 | 4700 | | 10% | | | | | JL-247 | 5HK-D47 | |
| C52 | .047 | 200 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C53 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C54 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | ① |
| C55 | 1500 | 1400 | | | HVD-15-4500 | DD30-152 | HVB20D15 | 2HV-215 | | |
| C56 | 1500 | 1400 | | | HVD-15-4500 | DD30-152 | HVB20D15 | 2HV-215 | | |
| C57 | 15 | 2000 | | | HVD-30-15 | DD30-150 | HVA20Q15 | 2DY-415 | 20GA-Q15 | |

① Not used in some versions.
② Some versions may use 10000mmf in this application.

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA David Bogen PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 100K | ½ | V392A | AB-40 | B47-100K-S | B11-128 | TA15L | Meter Adjust |
| B | Shaft | | | AK-1 | Not Req. | TM1 | Not Req. | |




CHASSIS BOTTOM VIEW-ALIGN, INDUCTOR & MISC. IDENT.

# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | David Bogen PART No. | NOTES |
|---|---|---|---|---|
| R2 | 100K | | | |
| R3 | 100Ω | | | |
| R4 | 1meg | | | |
| R5 | 10Ω | | | |
| R6 | 56K | | | |
| R7 | 22K | | | |
| R8 | 220Ω | | | |
| R9 | 220Ω | | | |
| R10 | 220K | | | |
| R11 | 3.3meg | | | |
| R12 | 47K | | | |
| R13 | 100Ω | | | |
| R14 | 1000Ω | | | |
| R15 | 470Ω | | | |
| R16 | 1meg | | | |
| R17 | 8200Ω | 2 | | |
| R18 | 22K | | | |
| R19 | 470K | | | |
| R20 | 220K | | | |
| R21 | 3300Ω | 1 | | |
| R22 | 100K | | | |
| R23 | 4700Ω | 1 | | |
| R24 | 68Ω | | | |
| R25 | 82K | | | |
| R26 | 120K | | | |
| R27 | 10K | | | |
| R28 | 33K | | | |
| R29 | 12K | | | |
| R30 | 100K | | | |
| R31 | 120K | | | |
| R32 | 100K | | | |
| R33 | 100K | | | |
| R34 | 100K | | | |
| R35 | 68K | | | |
| R36 | 470K | | | |
| R37 | 22K | | | |
| R38 | 100K | | | |
| R39 | 3.3meg | | | |
| R40 | 220K | | | |
| R41 | 68K | | | |
| R42 | 470K | | | |
| R43 | 4700Ω | | | |
| R44 | 10K | | | |
| R45 | 1meg | | | |
| R46 | 1200Ω 5% | | | |
| R47 | 47K | | | |
| R48 | 2700Ω | | | |
| R49 | 5600Ω | | Note 1 | |
| R50 | 33K | | | |
| R51 | 2200Ω | | | |
| R52A | 500Ω | 5 | | |
| B | 1000Ω | 10 | | |
| R53 | 68Ω | 1 | | |

Note 1. Some versions may use 3300Ω in this application.

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA: David Bogen PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| L1 | FM Ant. Trans | U452 | | | | | |
| L2 | FM Ant. Coil | U451 | 19-1000 | BC-561 | 4602 | | |
| L3 | RF Choke | U514 | | | | | 3 Turns On 47Ω |
| L4 | RF Choke | U420 | 19-1001 | BC-562 | 4604 | | 1.7 Microhenries |
| L5 | FM RF Coil | U477 | | | | | |
| L6 | FM Mixer Grid Coil | U478 | | | | | |
| L7 | FM Osc. Coil | U435 | | | | | |
| L8 | RF Choke | U432 | 19-1000 | BC561 | 4602 | | 1.1 Microhenries |
| L9 | RF Choke | U507 | | | | | 3.3 Microhenries, Note 1 |
| L10 | Loopstick | H668 | | | | | |
| L11 | AM Osc. Coil | H454 | 14-1412 | | | | |
| L12 | 1st FM IF | H615 | 16-3487 | FM-254 | 1463 | | |
| L13 | 1st AM IF | H297 | 16-6758 | BC-352 | 12-C1 | RF-1 | |
| L14 | 2nd FM IF | H355 | 16-3487 | FM-254 | 1463 | | |
| L15 | 2nd AM IF | H297 | 16-6758 | BC-353 | 12-C2 | RF-2 | |
| L16 | 3rd FM IF | H355 | 16-3487 | FM-254 | 1463 | | |
| L17 | 3rd AM IF | H297 | 16-6758 | BC-353 | 12-C2 | RF-2 | |
| L18 | 4th FM IF | H355 | 16-3487* | FM-254* | 1463* | | *Disregard Secondary |
| L19 | Discriminator | H295 | 17-3494 | FM-253 | 1464 | | |
| L20 | Fil. Choke | U512 | | | | | 1.9 Microhenries |
| L21 | Line Choke | U512 | | | | | 1.9 Microhenries |
| L22 | Line Choke | U512 | | | | | 1.9 Microhenries |
| L23 | 10KC Filter | U627 | | | | | |

Note 1. IRC Part No. CLA

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | REPLACEMENT DATA: David Bogen PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117V@ .48A | 440 VCT @.070A | 6.3V@ 3.1A | 83-505-010 | | | | PM8419① | | |

① Drill new mounting holes.

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA: David Bogen PART No. | CBS PART No. | SYLVANIA PART No. | NOTES |
|---|---|---|---|---|---|
| M1 | 1N541 | | 1N636 | 1N295 | AM Detector (Pigtail) |
| M2 | 1N541 * | | 1N636 | 1N295 | Discriminator (Pigtail) |
| M3 | 1N541 * | | 1N636 | 1N295 | Discriminator (Pigtail) |

* Some versions may use 1N542 in this application.

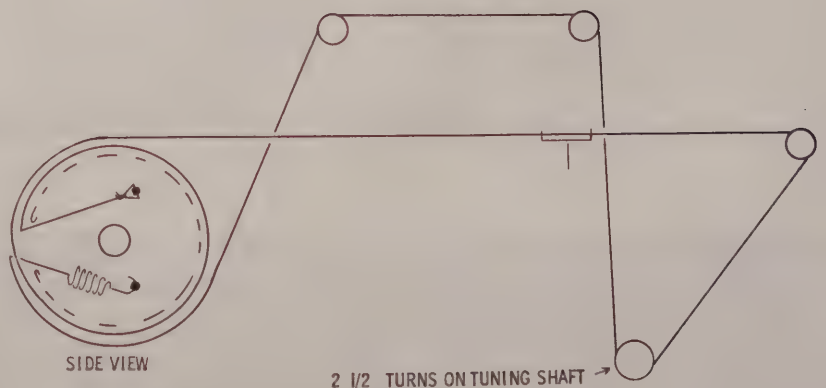
## MISCELLANEOUS

| ITEM No. | PART NAME | David Bogen PART No. | NOTES |
|---|---|---|---|
| M4 | Lamp | | #12 |
| M5 | Tuning Cap. | C647 | FM-AM, 6 Section |
| M6 | Switch | S527 | Function Selector, 4 Position, Rotary, Wafer Type |
| M7 | Meter | H453 | Tuning |

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



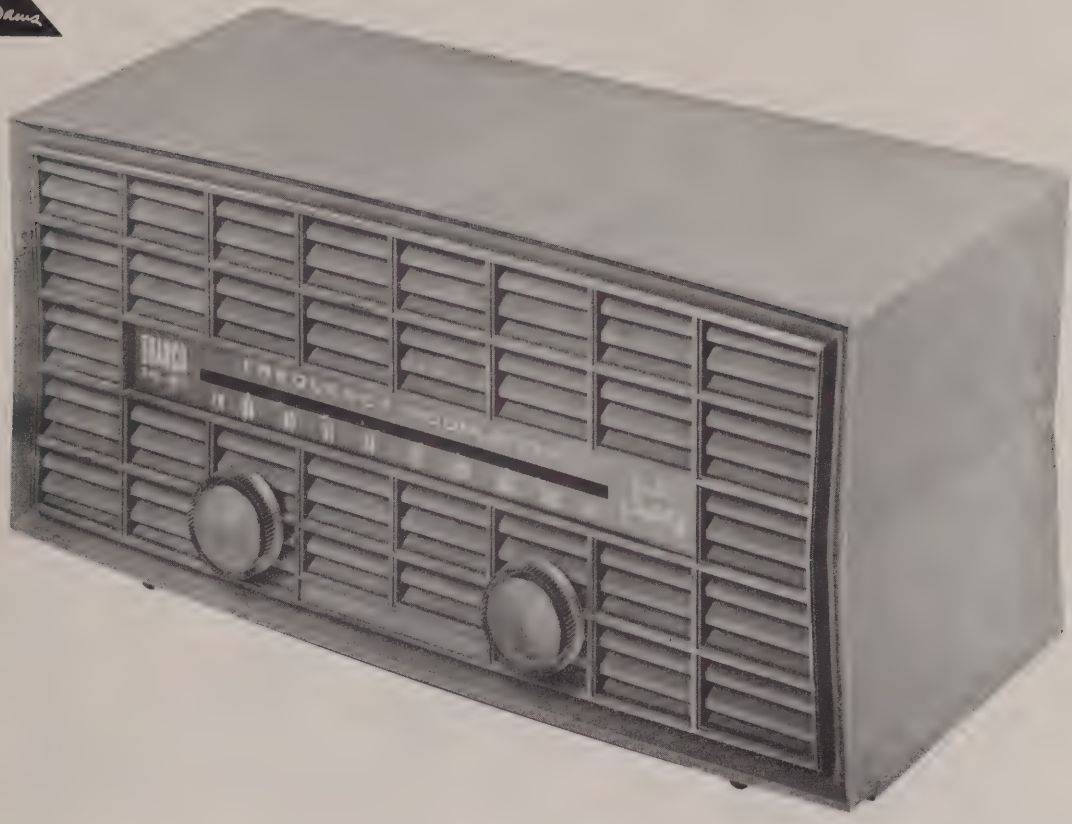

## DIAL CORD STRINGING

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# GRANCO MODEL 611

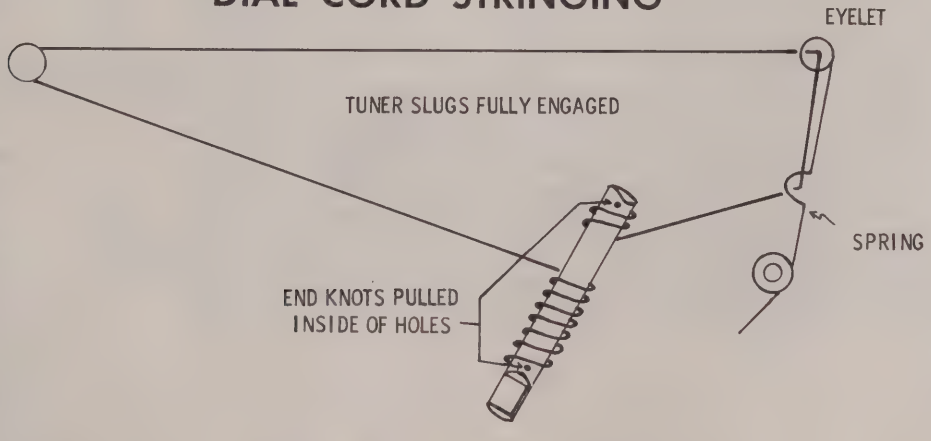
GRANCO MODEL 611



GRANCO MODEL 611

| | |
|---|---|
| TRADE NAME | Granco Model 611 |
| MANUFACTURER | Granco Products, Inc., 36-07 20th Ave., Long Island City 5, N. Y. |
| TYPE SET | AC-DC Operated FM Receiver |
| TUBES | Six |
| POWER SUPPLY | 105 - 120 Volts AC-DC |
| TUNING RANGE-FREQ. MOD. | 88 - 108MC RATING 33 Watts, .365 Amp. @117 Volts AC |

## DIAL CORD STRINGING



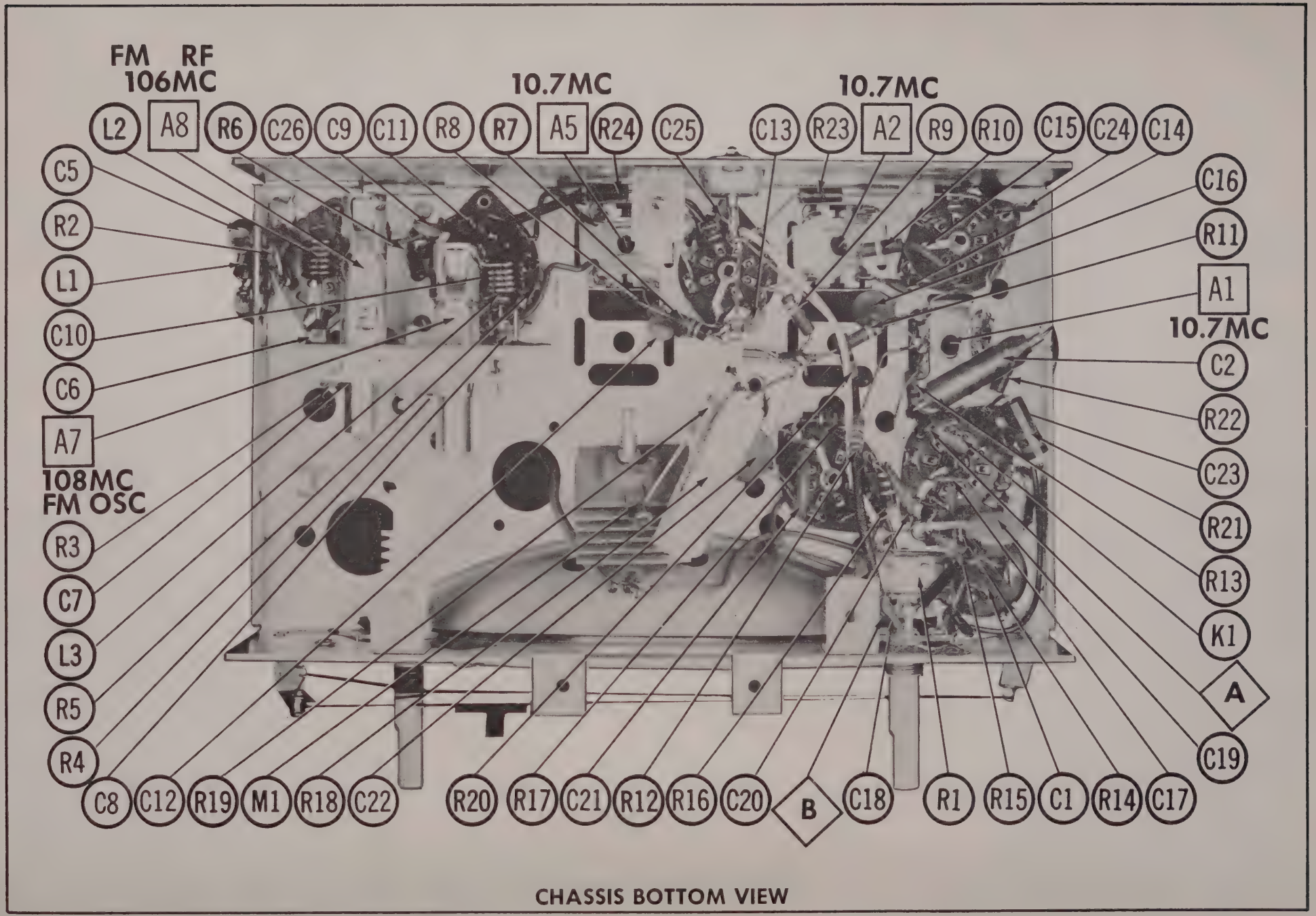

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H962



SET 439 FOLDER 6




CHASSIS BOTTOM VIEW

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 12BA6 | |
| V2 | Mixer-Osc. | 12AT7 | |
| V3 | 1st IF Amplifier | 12BA6 | |
| V4 | 2nd IF Amplifier | 12BA6 | |
| V5 | Ratio Det.-AF Amp. | 19T8 | |
| V6 | Output | 50C5 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | GRANCO PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1A | ■80 | 150 | AC-471 | AFH2-19 | XB0181 | FP216 | TMD-17 | TVL-2442.1 | |
| B | ▲50 | 150 | | | | | | | |
| C2 | 2 | 70 | | PRS50V2 | BBR2-50 | TT150X2 | TD-2-50 | TVA-1301 | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | GRANCO PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C3 | 10 | | 10% | | NPO-SI 10 | D6-100 | CTACQ1C | 2T-541 | 5TCC-Q1 | |
| C4 | 51 | | | | SI 51 | | | | | |
| C5 | 51 | | | | SI 51 | | | | | |
| C6 | 1000 | | | | EF-001 | MFT-1000 | | | 503C-D1 | |
| C7 | 1000 | | | | EF-001 | MFT-1000 | | | 503C-D1 | |
| C8 | 2000 | | | | | | | | | |
| C9 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | |
| C10 | 80 | | N1400 10% | | | | | | | |
| C11 | 10 | | N150 5% | | | | | | | |
| C12 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C13 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C14 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C15 | 4700 | | | | BPD-0047 | DD-472 | BYA10D47 | B-247 | 5HK-D47 | |
| C16 | 100 | | | | BPD-0001 | DD-101 | L10T1 | CNO-310 | 5GA-T1 | |
| C17 | 6.8 | | N150 10% | | | | | | | |
| C18 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C19 | 4700 | | | | BPD-0047 | DD-472 | BYA10D47 | B-247 | 5HK-D47 | ② |
| C20 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5GA-S1 | |
| C21 | 4700 | | | | BPD-0047 | DD-472 | BYA10D47 | B-247 | 5HK-D47 | ② |
| C22 | 4700 | | | | BPD-0047 | DD-472 | BYA10D47 | B-247 | 5HK-D47 | ③ |
| C23 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C24 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C25 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |
| C26 | 1500 | | | | BPD-0015 | DD-152 | BYA10D15 | B-215 | 5HK-D15 | ① |

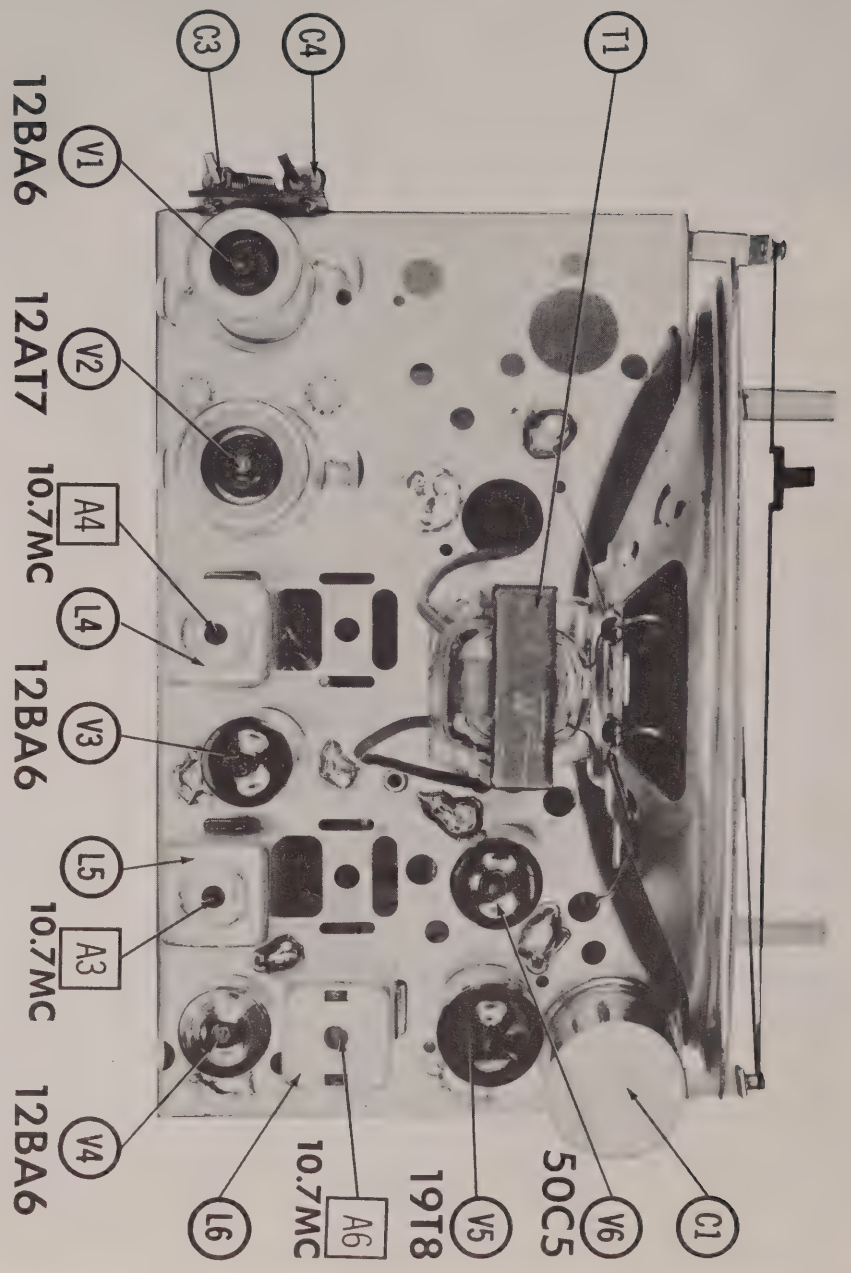
① Some versions may use 2000mmf.
② Some versions may use 4000mmf.
③ Not used in some versions.

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | GRANCO PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 500K | ½ | 45-10 ① | AB-59 | A47-500K-S | Q11-133 | U50 | Volume |
| B | Shaft | | | AK-19 | RN-3 | TQ | Not Req. | |
| C | Switch | | | KB-1 or KR-1* | SWE-12 | 76-1 | US-26 | |

① Part #B0458 (1meg) used in some versions.
* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

## CHASSIS—TOP VIEW



# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and chassis.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Suggested alignment tools:

A1, A2..... GENERAL CEMENT #5097, 8727
WALSCO #2515
A3 thru A6..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2543, 2544, 2545, 2526
A7, A8..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728
WALSCO #2515, 2531, 2532

**FM IF ALIGNMENT USING AM SIGNAL GENERATOR & VTVM**

Connect two matched 100K (±1%) resistors in series from point (A) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01mfd. | High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (Unmod.) | Point of non-interference | DC probe to point (A). Common to chassis. | A1, A2, A3, A4, A5 | Adjust for maximum deflection. |
| 2. | " | " | " | " | DC probe to point (B). Common to point (C). | A6 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

**FM IF ALIGNMENT USING FM SIGNAL GENERATOR & OSCILLOSCOPE**

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01mfd. | High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (450KC SWP) | Point of non-interference | Vert. amp to point (A). Low side to chassis. | A1, A2, A3, A4, A5 | Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude & symmetry as in Fig. 1. |
| 2. | " | " | " | " | Vert. amp to point (B). Low side to chassis. | A6 | Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A1 for maximum amplitude and straightness of crossover lines. |

**FM RF ALIGNMENT**

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 3. | 270Ω carbon resistor | High side to FM antenna terminal. Low side to chassis. | 108MC (Unmod.) | Tuning gang fully open | DC probe to point (A). Common to chassis. | A7 | Adjust for maximum deflection. |
| 4. | " | " | 106MC | Tune to 106MC signal | DC probe to point (A). Common to chassis. | A8 | " |

FIG. 1

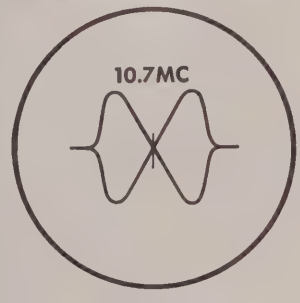


FIG. 2

# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | GRANCO PART No. | NOTES |
|---|---|---|---|---|
| R2 | 470K | | | |
| R3 | 330Ω | | | |
| R4 | 100Ω | | | |
| R5 | 470K | | | |
| R6 | 10K | | | |
| R7 | 330Ω | | | |
| R8 | 220K | | | |
| R9 | 330Ω | | | |
| R10 | 100K | | | |
| R11 | 330Ω | | | |
| R12 | 33K | | | |
| R13 | 1meg | | | |
| R14 | 4.7meg | | | |
| R15 | 220K | | | |
| R16 | 470K | | | |
| R17 | 160Ω | | | |
| R18 | 900Ω | 4 | | |
| R19 | 22Ω | | | |
| R20 | 10Ω | | | |
| R21 | 470Ω | 2 | | |
| R22 | 10Ω | | | |
| R23 | 10Ω | | | |
| R24 | 10Ω | | | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA GRANCO PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| L1 | Ant. Coil | AL477 | 19-1000 | BC-561 | 4602 | | |
| L2 | RF Coil | AL141 | | | | | |
| L3 | Osc. Coil | | | | | | |
| L4 | 1st IF Trans. | 28-1 ① | 16-3487 | FM-254 | 1463 | | |
| L5 | 2nd IF Trans. | 28-1 ① | 16-3487 | FM-254 | 1463 | | |
| L6 | Ratio Detector | CL473 | 17-3498 | FM-255 | 1465 | | |

① Alternate Part#CL472.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA GRANCO PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 2600Ω | 3-4Ω | | Z1101 | A-3025 | AU-605 | A-3332 | 24S53 | S-12X | If oscillation occurs, reverse secondary leads |

## SPEAKER

| ITEM No. | TYPE SIZE | TYPE FIELD | TYPE V. C. IMP. | REPLACEMENT DATA GRANCO PART No. | REPLACEMENT DATA QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 4"X6" | PM | 3-4Ω | 34-4 ① | 46A1 ② | ① Alternate Part #CZ467<br>② Fabricate Mounting |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | GRANCO PART No. | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Ratio Det. Plate Filter | 2000mmf, 22K | | |

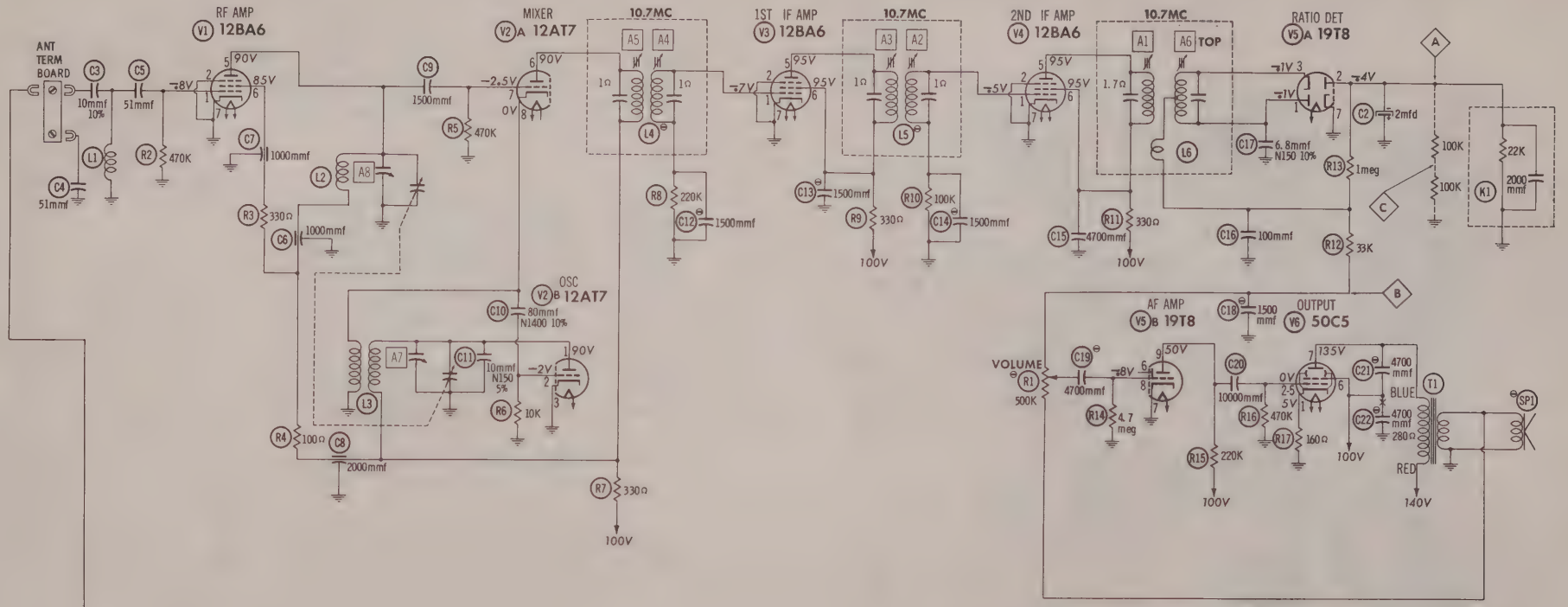
## SELENIUM RECTIFIER

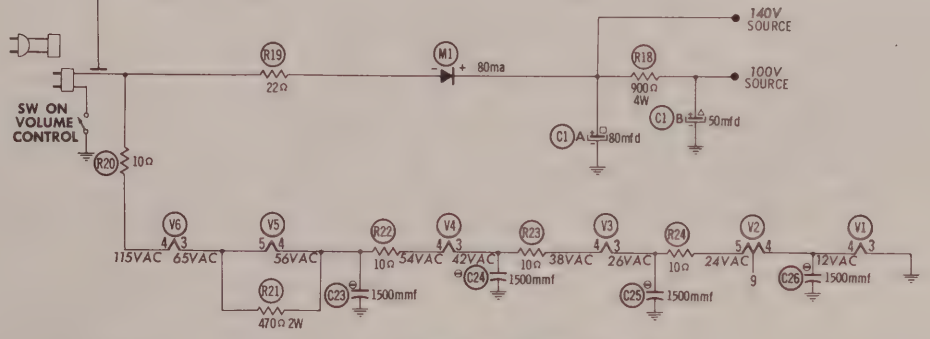
| ITEM No. | RATING CURRENT (Measured) | REPLACEMENT DATA GRANCO PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | NOTES |
|---|---|---|---|---|---|---|
| M1 | .079A | B457 | 1235AH | T100<br>SD-94 ① | 100A<br>K200 ① | ① Silicon Type |

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)




θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 12BA6 | 470K | 0Ω | 0Ω | 12Ω | †1300Ω | †1600Ω | 0Ω | | |
| V2 | 12AT7 | †1200Ω | 10K | 0Ω | 12Ω | 24Ω | †1200Ω | 470K | 0Ω | 18Ω |
| V3 | 12BA6 | 220K | 0Ω | 34Ω | 46Ω | †1200Ω | †1200Ω | 0Ω | | |
| V4 | 12BA6 | 100K | 0Ω | 56Ω | 68Ω | †1200Ω | †1200Ω | 0Ω | | |
| V5 | 19T8 | 330K | 22K | 330K | 78Ω | 95Ω | NC | 0Ω | 4.7meg | †220K |
| V6 | 50C5 | 160Ω | 470K | 95Ω | 140Ω | 470K | †900Ω | †280Ω | | |

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

**GRANCO MODEL 611**

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

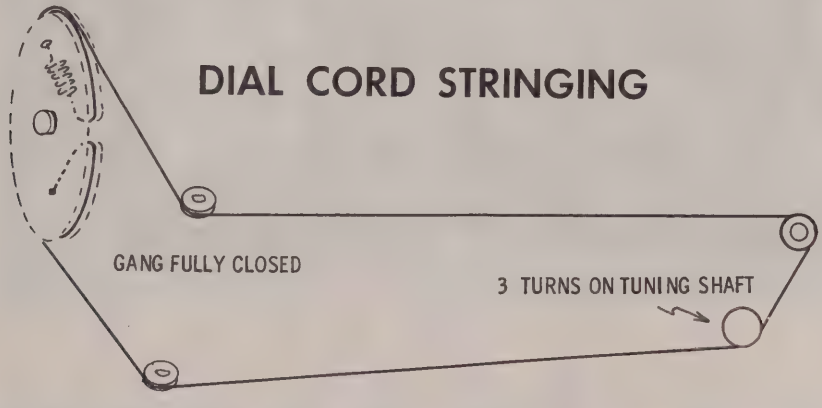
# LAFAYETTE MODEL LT-40

LAFAYETTE
MODEL LT-40

LAFAYETTE
MODEL LT-40

| | | | |
|---|---|---|---|
| TRADE NAME | Lafayette Model LT-40 | | |
| SUPPLIER | Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N. Y. | | |
| TYPE SET | AC Operated, 7 Tube FM-AM Tuner | | |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles | RATING | 30 Watts, .31 Amp. @117 Volts AC |
| TUNING RANGE - BROADCAST | 520 - 1725KC | FREQ. MOD. | 88 - 108MC |

## DIAL CORD STRINGING



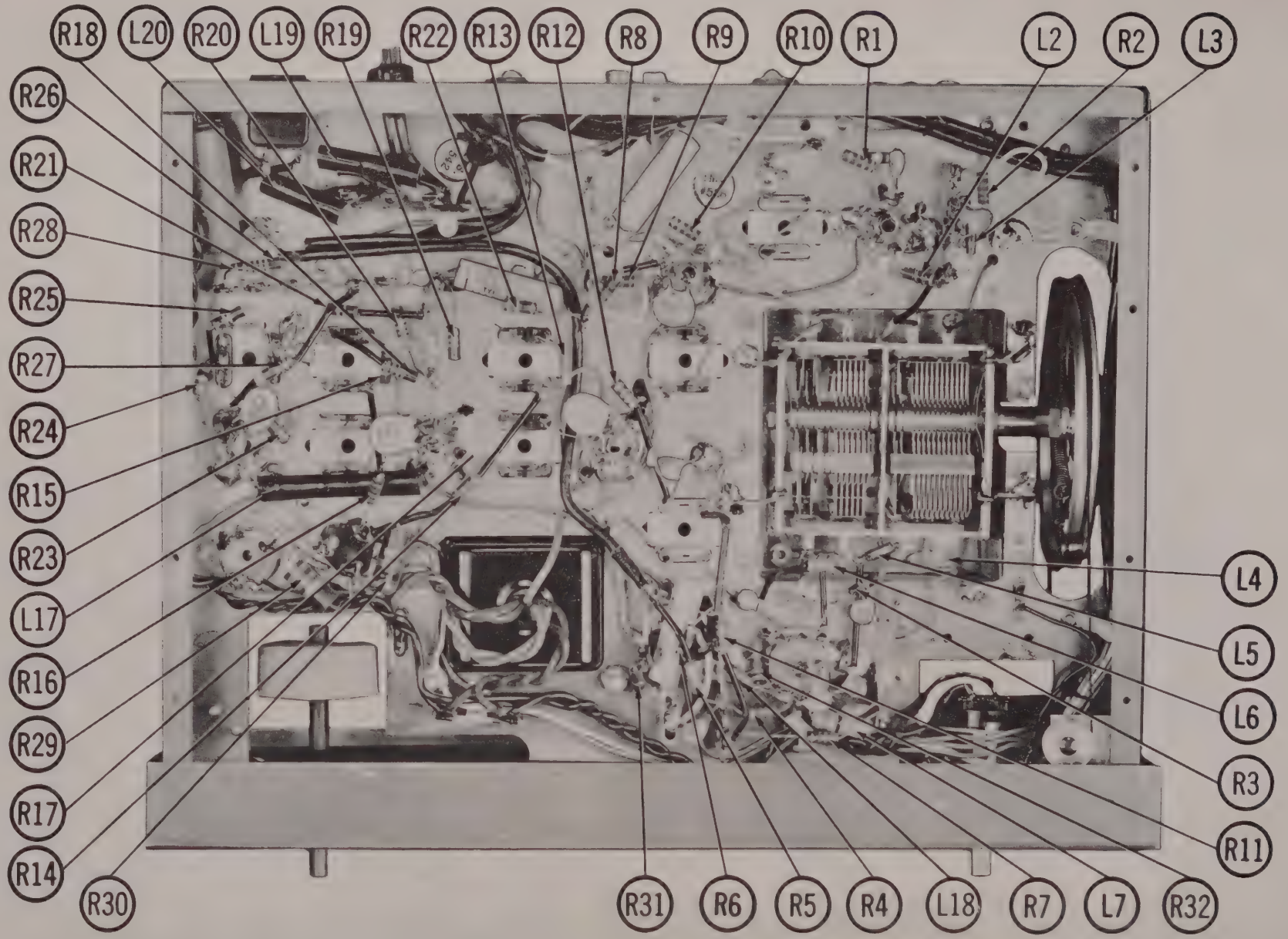

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

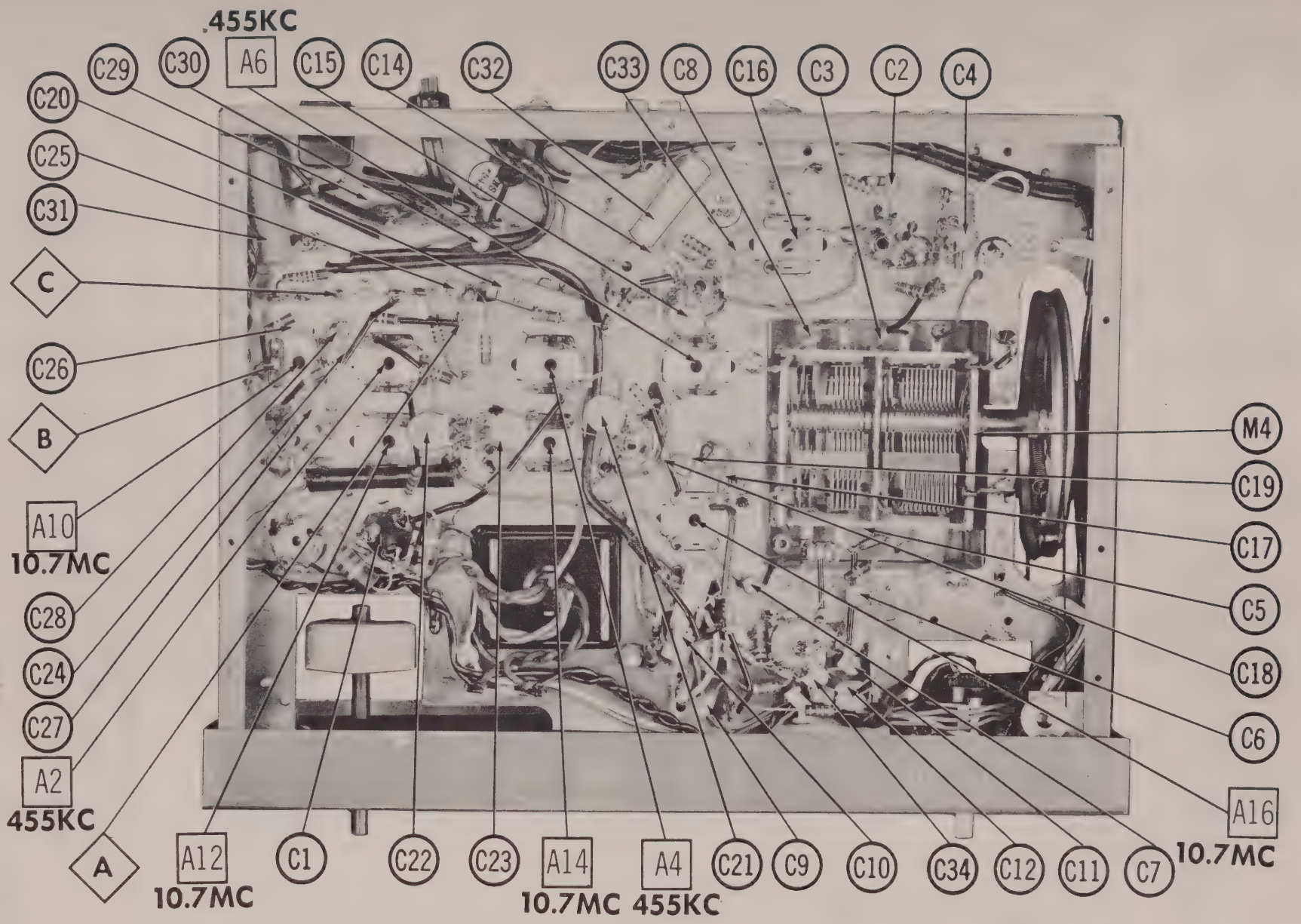
H943



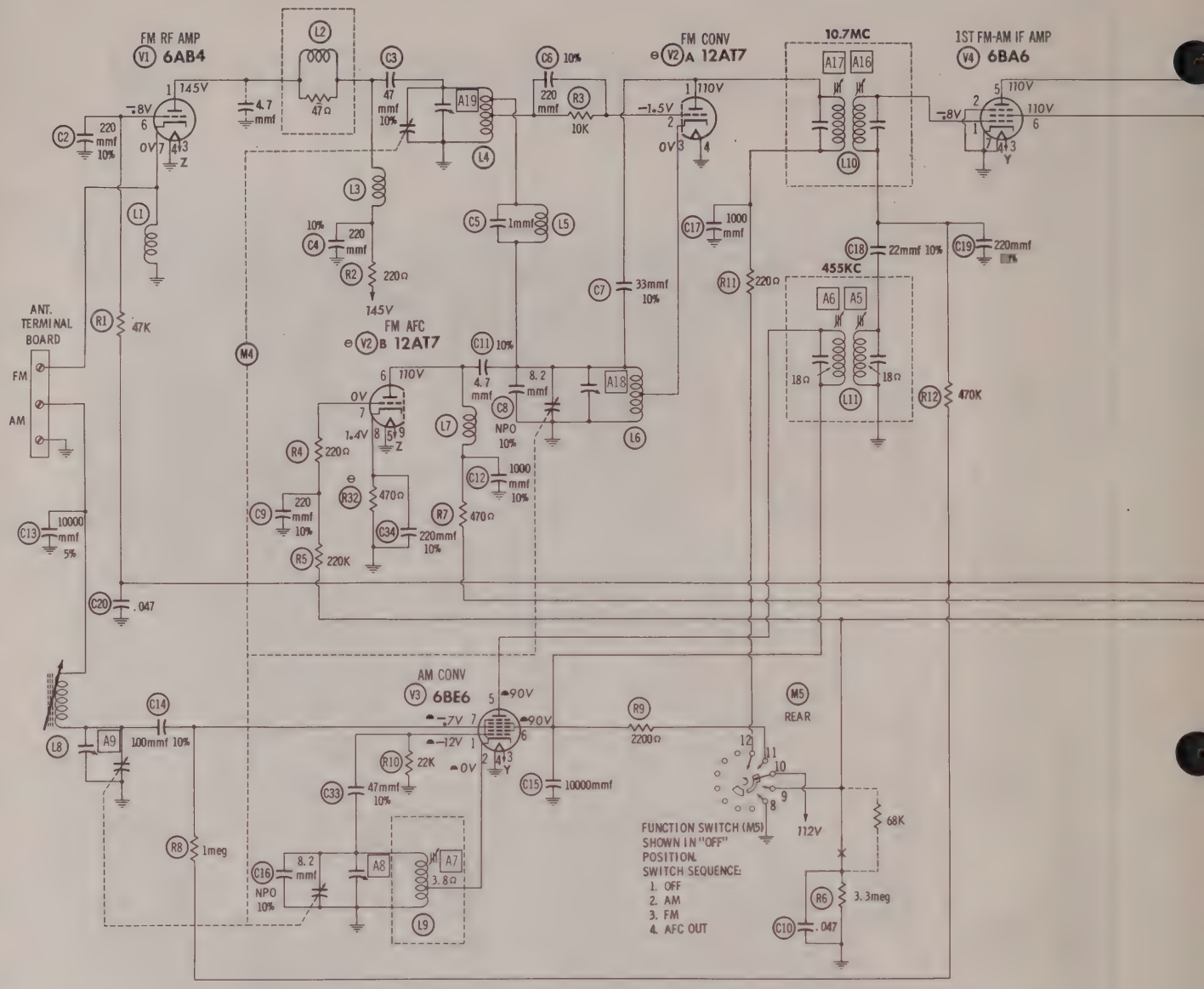
SET 439 FOLDER 7




CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION




CHASSIS BOTTOM VIEW - CAPACITOR, ALIGN. & MISC. IDENT.




1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

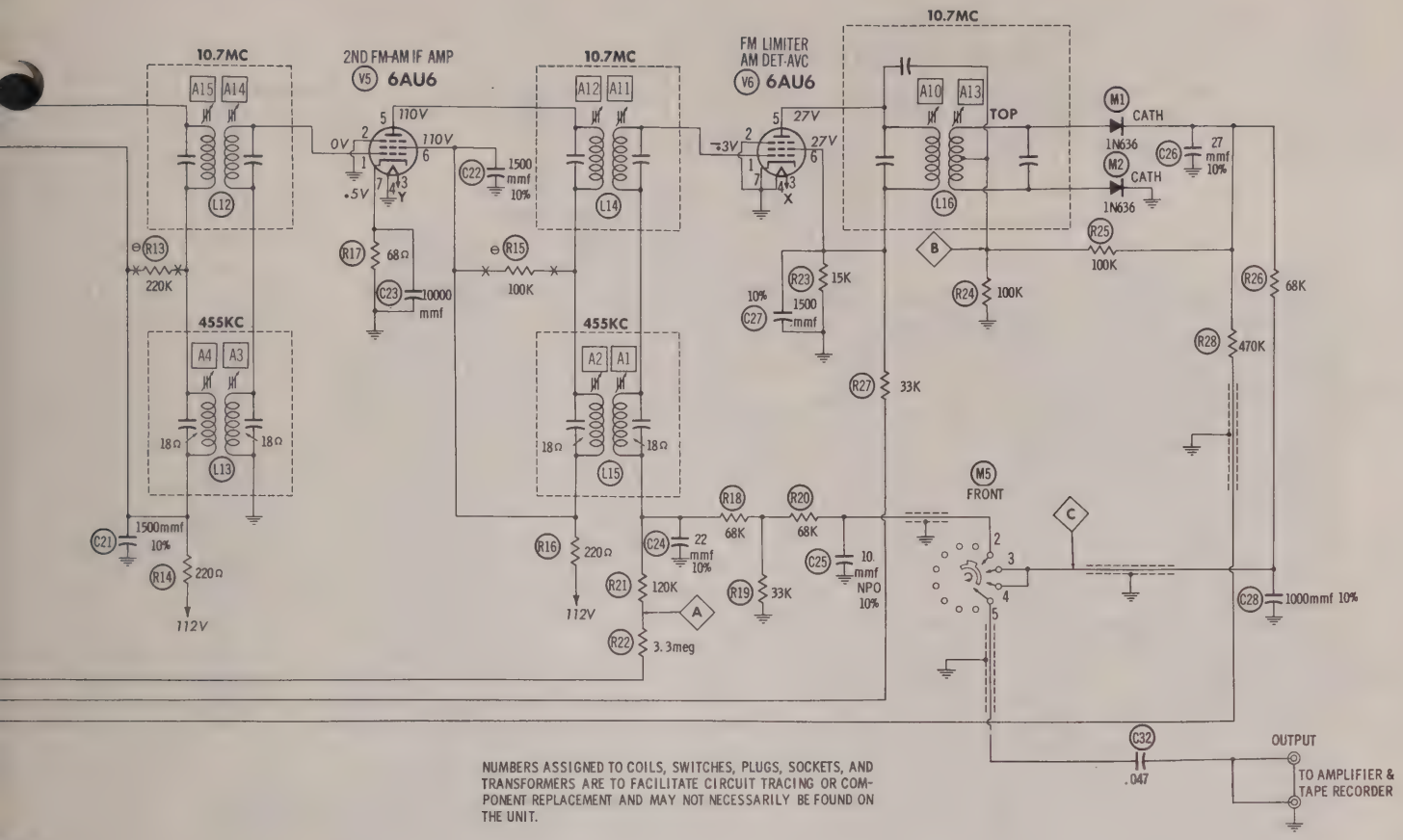
Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

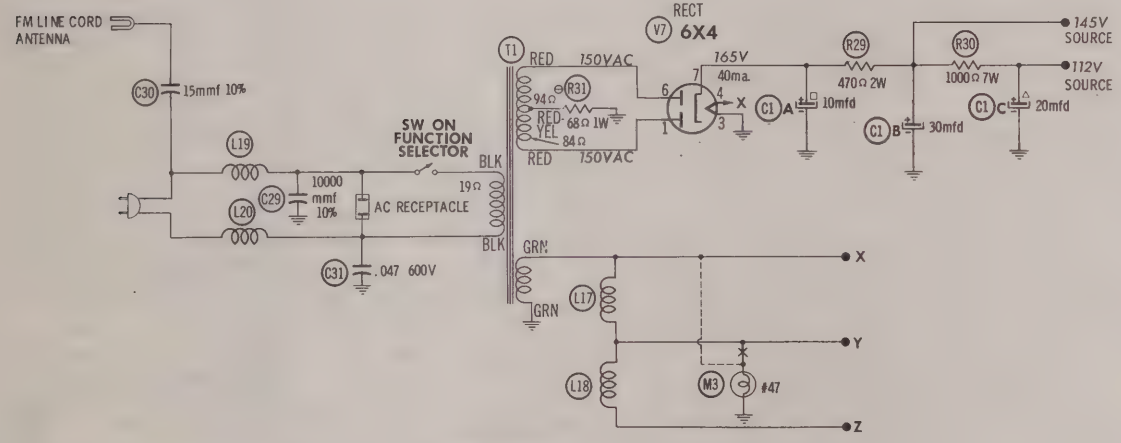
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959




NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AB4 | †690Ω | 0Ω | .1Ω | 0Ω | 0Ω | 3.5meg | .1Ω | | |
| V2 | ECC81 12AT7 | †1700Ω | 10K | 0Ω | 0Ω | 0Ω | †1900Ω | ■ 600K 220K | 470Ω | .1Ω |
| V3 | 6BE6 | 22K | .5Ω | .1Ω | 0Ω | ▲ †3700Ω | ▲ †3700Ω | ▲ 4.5meg | | |
| V4 | 6BA6 | 3.9meg | 0Ω | .1Ω | 0Ω | †1700Ω | †1700Ω | 0Ω | | |
| V5 | 6AU6 | 19Ω | 0Ω | .1Ω | 0Ω | †1700Ω | †1700Ω | 68Ω | | |
| V6 | 6AU6 | 100K | 0Ω | .1Ω | 0Ω | †34K | †34K | 0Ω | | |
| V7 | 6X4 | 152Ω | NC | 0Ω | .1Ω | NC | 162Ω | ¶ | | |

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▲ MEASURED IN "AM" POSITION.
† MEASURED FROM PIN 7 OF V7. ■ MEASURED IN "FM-AFC" POSITION.
NC NO CONNECTION.

**LAFAYETTE**
**MODEL LT-40**

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

| | |
|---|---|
| A1 thru A6, A14 thru A17 | GENERAL CEMENT #5097, 8727<br>WALSCO #2515 |
| A7, A10, A13 | GENERAL CEMENT #8606, 8606L, 8282, 9295<br>WALSCO #2526, 2543, 2544, 2545 |
| A8, A9, A19 | GENERAL CEMENT #5000, 5003, 5009, 8290<br>WALSCO #2515, 2520, 2523, 2525, 2537 |
| A11, A12 | GENERAL CEMENT #5097, 8282, 8606, 8606L, 9089, 9091<br>WALSCO #2526, 2541, 2542, 2543, 2544 |
| A18 | GENERAL CEMENT #5009, 8271, 8275, 8276, 8721, 8722, 9150, 9298<br>WALSCO #2516, 2519 |

AM ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .01mfd | High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis. | 455KC (400∿ Mod.) | AM | 1500KC | DC probe to point Ⓐ. Common to chassis. | A1, A2, A3, A4, A5, A6 | Adjust for maximum deflection. |
| 2. | " | High side to AM antenna terminal. Low side to chassis. | 600KC | " | 600KC | " | A7 | " |
| 3. | " | " | 1500KC | " | 1500KC | " | A8, A9 | " |

FM IF ALIGNMENT USING AM SIGNAL GENERATOR & VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .01mfd. | High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (Unmod.) | FM | Point of non-interference | DC probe to point Ⓑ. Common to chassis. | A10, A11, A12, A13, A14, A15, A16 | Adjust for maximum deflection. |
| 5. | " | " | " | " | " | DC probe to point Ⓒ. Common to chassis. | A17 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR & OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .01mfd. | High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (450KC SWP) | FM | Point of non-interference | Vert. Amp to point Ⓑ. Low side to chassis. | A10, A11, A12, A13, A14, A15, A16 | Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. |
| 5. | " | " | " | " | " | Vert. Amp to point Ⓒ. Low side to chassis. | A17 | Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines. |

FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | 270Ω Carbon Resistor | High side thru 270Ω to FM antenna terminal. Low side to chassis. | 104MC (Unmod.) | FM | 104MC | DC probe to point Ⓐ. Common to chassis. | A18, A19 | Adjust for maximum deflection. |

FIG. 1

FIG. 2

CHASSIS TOP VIEW

LAFAYETTE
MODEL LT-40

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE |
|---|---|---|
| V1 | FM RF Amplifier | 6AB4 |
| V2 | FM Conv. - FM AFC | 12AT7/ ECC81 |
| V3 | AM Converter | 6BE6 |
| V4 | 1st FM-AM IF Amplifier | 6BA6 |
| V5 | 2nd FM-AM IF Amplifier | 6AU6 |
| V6 | FM Limiter-AM Det. -AVC | 6AU6 |
| V7 | Rectifier | 6X4 |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA LAFAYETTE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 10 | 250 | C543 | AFH3-18 | C0140 | FP231.3 | TMT-18 | TVL-3537 | |
| B | 30 | 150 | | | | TC47 | | | |
| C | 20 | 200 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA LAFAYETTE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C2 | 220 | | 10% | | DI-220 | DD-221 | L10T22 | JL-322 | MS-322 | |
| C3 | 47 | | 10% | | NPO-DI 47 | DD-470 | L10Q47 | CNO-447 | MS-447 | |
| C4 | 220 | | 10% | | DI-220 | DD-221 | L10T22 | JL-322 | MS-322 | |
| C5 | 1 | | | | | | | | 5TCCB-V1 | |
| C6 | 220 | | 10% | | DI-220 | DD-221 | L10T22 | JL-322 | MS-322 | |
| C7 | 33 | | 10% | | DI-33 | DD-330 | L10Q33 | CNO-433 | MS-433 | |
| C8 | 8.2 | | NPO 10% | | NPO-DI 8.2 | MD-8R2 | C10V82C | | | |
| C9 | 220 | | | | DI-220 | DI-221 | L10T22 | JL-322 | MS-322 | |
| C10 | .047 | 200 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C11 | 4.7 | | 10% | | NPO-DI 4.7 | TCZ-4R7 | C10V47C | CNO-547 | 5TCCB-V47 | |
| C12 | 1000 | | 10% | | DI-1000 | | | JL-210 | MS-21 | |
| C13 | 10000 | | 5% | | | | | | | |
| C14 | 100 | | 10% | | DI-100 | | 5R5T1 | JL-310 | MS-31 | |
| C15 | 10000 | | | | DI-10000 | DD-103 | | | | |
| C16 | 8.2 | | NPO 10% | | NPO-DI 8.2 | MD-8R2 | C10V820 | | 5TCCB-V82 | |
| C17 | 1000 | | | | DI-1000 | DD-102 | | JL-210 | MS-21 | |
| C18 | 22 | | 10% | | DI-22 | DD-220 | L10Q22 | CNO-422 | MS-322 | |
| C19 | 220 | | 10% | | DI-220 | DD-221 | L10T22 | JL-322 | | |
| C20 | .047 | 200 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C21 | 1500 | | 10% | | DI-1500 | | | JL-215 | MS-215 | |
| C22 | 1500 | | 10% | | DI-1500 | | | JL-215 | MS-215 | |
| C23 | 10000 | | | | DI-10000 | DD-103 | | | | |
| C24 | 22 | | 10% | | DI-22 | DD-220 | L10Q22 | CNO-422 | MS-322 | |
| C25 | 10 | | NPO 10% | | NPO-DI 10 | DTZ-10 | C10Q1C | CNO-410 | 5TCC-Q1 | |
| C26 | 27 | | 10% | | DI-27 | DD-270 | L10Q27 | CNO-427 | MS-427 | |
| C27 | 1500 | | 10% | | DI-1500 | | | JL-215 | MS-215 | |
| C28 | 1000 | | 10% | | DI-1000 | | | JL-210 | MS-21 | |
| C29 | 10000 | | 10% | | DI-10000 | | | | | |
| C30 | 15 | | 10% | | DI-15 | DD-150 | L10Q15 | CNO-415 | MS-415 | |
| C31 | .047 | 600 | | | P688N-047 | DF-503 | CUB6S47 | GEM-6147 | 6TM-S47 | |
| C32 | .047 | 200 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C33 | 47 | | 10% | | NPO-DI 47 | DD-470 | L10Q47 | CNO-447 | MS-447 | |
| C34 | 220 | | 10% | | DI-220 | DD-221 | L10T22 | JL-322 | MS-322 | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | LAFAYETTE PART No. | NOTES |
|---|---|---|---|---|
| R1 | 47K | | | |
| R2 | 220Ω | | | |
| R3 | 10K | | | |
| R4 | 220Ω | | | |
| R5 | 220K | | | |
| R6 | 3.3meg | | | |
| R7 | 470Ω | | | |
| R8 | 1meg | | | |
| R9 | 2200Ω | | | |
| R10 | 22K | | | |
| R11 | 220Ω | | | |
| R12 | 470K | | | |
| R13 | 220K | | | Note 1 |
| R14 | 220Ω | | | |
| R15 | 100K | | | Note 1 |
| R16 | 220Ω | | | |
| R17 | 68Ω | | | |
| R18 | 68K | | | |

## RESISTORS (cont)

| ITEM No. | RATING OHMS | RATING WATT | LAFAYETTE PART No. | NOTES |
|---|---|---|---|---|
| R19 | 33K | | | |
| R20 | 68K | | | |
| R21 | 120K | | | |
| R22 | 3.3meg | | | |
| R23 | 15K | | | |
| R24 | 100K | | | |
| R25 | 100K | | | |
| R26 | 68K | | | |
| R27 | 33K | | | |
| R28 | 470K | | | |
| R29 | 470Ω | 2 | | |
| R30 | 1000Ω | 7 | | |
| R31 | 68Ω | 1 | | Note 2 |
| R32 | 470Ω | | | Note 3 |

Note 1. Not used in some versions.
Note 2. Some versions may use 47Ω 2W in this application.
Note 3. Some versions may use 220Ω in this application.

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA LAFAYETTE PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | NOTES |
|---|---|---|---|---|---|---|---|
| L1 | FM Ant. Coil | U-420 | 19-1001 | BC-562 | 4604 | | |
| L2 | RF Choke | U-514 | | | | | 3 Turns On 47Ω |
| L3 | RF Choke | U-420 | 19-1001 | BC-562 | 4604 | | 1.7 Microhenries |
| L4 | FM RF Coil | U-474 | | | | | |
| L5 | RF Choke | U-420 | 19-1001 | BC-562 | 4604 | | 1.7 Microhenries |
| L6 | FM Osc. | U-473 | | | | | |
| L7 | RF Choke | U-501 | 19-1000 | BC-561 | 4602 | | 1 Microhenry ① |
| L8 | Loopstick | H-452C | | | | | |
| L9 | AM Osc. Coil | H-454 | 14-1412 | | | | |
| L10 | 1st FM IF | H-458 | 16-3487 | FM-254 | 1463 | | |
| L11 | 1st AM IF | H-297 | 16-6758 | 12-C1 | BC-352 | RF-1 | |
| L12 | 2nd FM IF | H-355 | 16-3487 | FM-254 | 1463 | | |
| L13 | 2nd AM IF | H-297 | 16-6758 | BC-353 | 12-C2 | RF-2 | |
| L14 | 3rd FM IF | H-355 | 16-3487 | FM-254 | 1463 | | |
| L15 | 3rd AM IF | H-297 | 16-6758 | BC-353 | 12-C2 | RF-2 | |
| L16 | Discriminator | H-665 | 17-3494 | FM-253 | 1464 | | |
| L17 | Fil. Choke | U-512 | | | | | 1.9 Microhenries |
| L18 | Fil. Choke | U-420 | 19-1001 | BC-562 | 4604 | | 1.7 Microhenries |
| L19 | Line Choke | U-512 | | | | | 1.9 Microhenries |
| L20 | Line Choke | U-512 | | | | | 1.9 Microhenries |

① IRC Part #CLA

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | REPLACEMENT DATA LAFAYETTE PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117V Ⓐ .31A | 300 VCT Ⓐ .040A | 6.3V Ⓐ 2.75A | T375-1D | | | | | | |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA LAFAYETTE PART No. | CBS PART No. | SYLVANIA PART No. | NOTES |
|---|---|---|---|---|---|
| M1 | 1N636 | | 1N636 | 1N295 | FM Discriminator (Pigtail) |
| M2 | 1N636 | | 1N636 | 1N295 | FM Discriminator (Pigtail) |

## MISCELLANEOUS

| ITEM No. | PART NAME | LAFAYETTE PART No. | NOTES |
|---|---|---|---|
| M3 | Lamp | | #47 |
| M4 | Tuning Cap. | C638 | FM-AM, 4 Gang(AM Sections: Ant. 13-537mmf, Osc. 9-191mmf) |
| M5 | Switch | S513 | Function Selector (4 Position, Rotary Wafer, Includes Rotary Snap Type Power On-Off). |

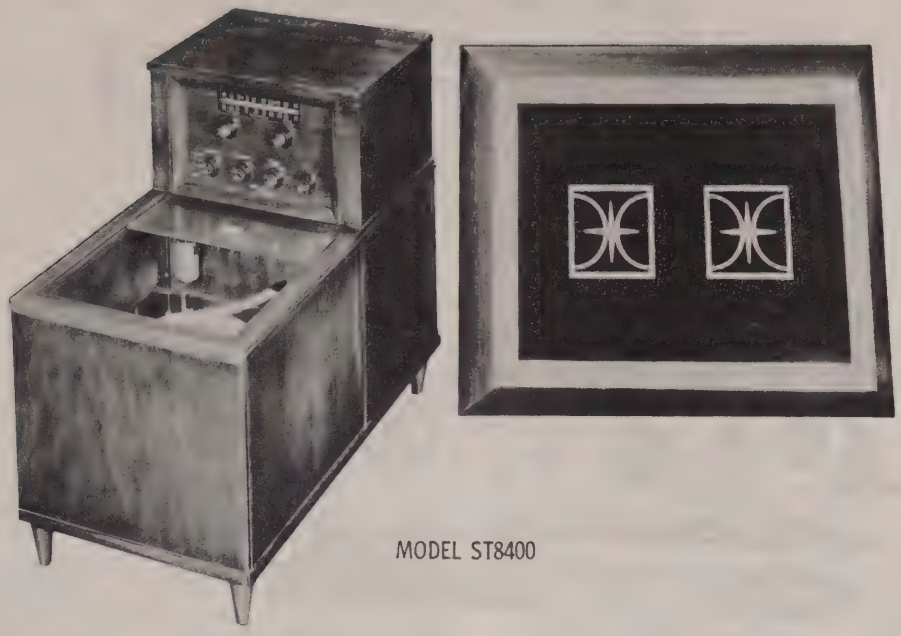
## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder



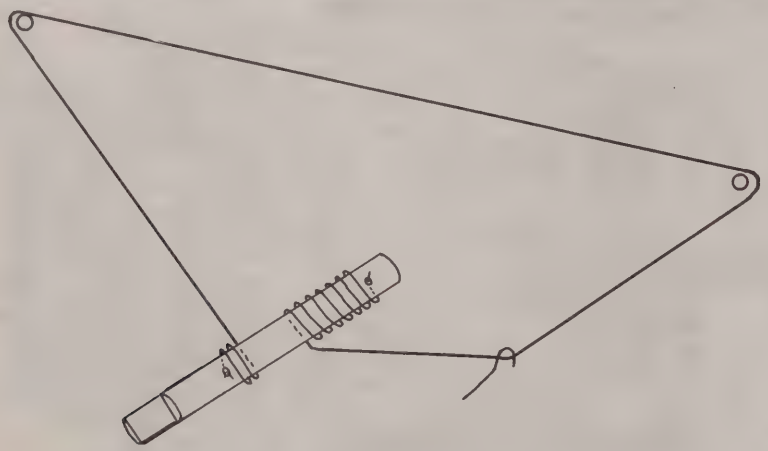
MURASONDE MODEL 8125, L8200, L8400,
SA8200, SA8400, ST8200, ST8400



MODEL ST8400

| | |
|---|---|
| TRADE NAME | Murasonde Models 8125, L8200, L8400, SA8200, SA8400 (Amp & Record Changer)<br>ST8200, ST8400 (FM-AM Tuner, Amp & Record Changer) |
| MANUFACTURER | Whitley Electronics, Columbia City, Indiana |
| TYPE SET | AC Operated FM-AM Tuner and Amplifier With 4 Speed Automatic Record Changer |
| TUBES | Tuner: 6<br>Amp: 5 |
| POWER SUPPLY | 110 - 120 Volts AC 60 Cycles |
| RATING | 100 Watts, 1.04Amp. @117 Volts AC<br>75 Watts, .76 Amp. @117 Volts AC (Amp only) |
| TUNING RANGES | BROADCAST 535-1650KC |
| FREQ. MOD. | 88-108MC |

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M 1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.



## DIAL CORD STRINGING

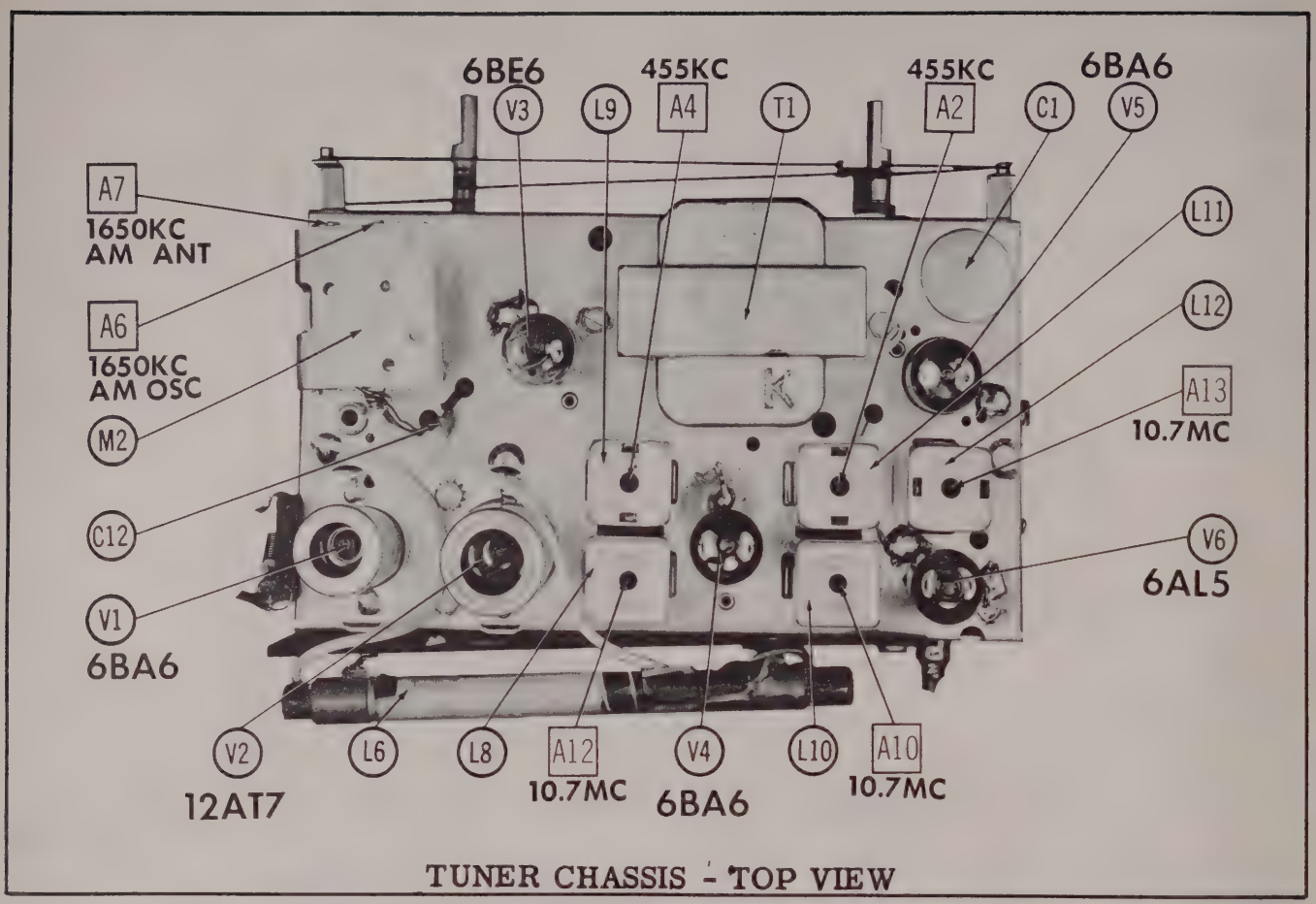
**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

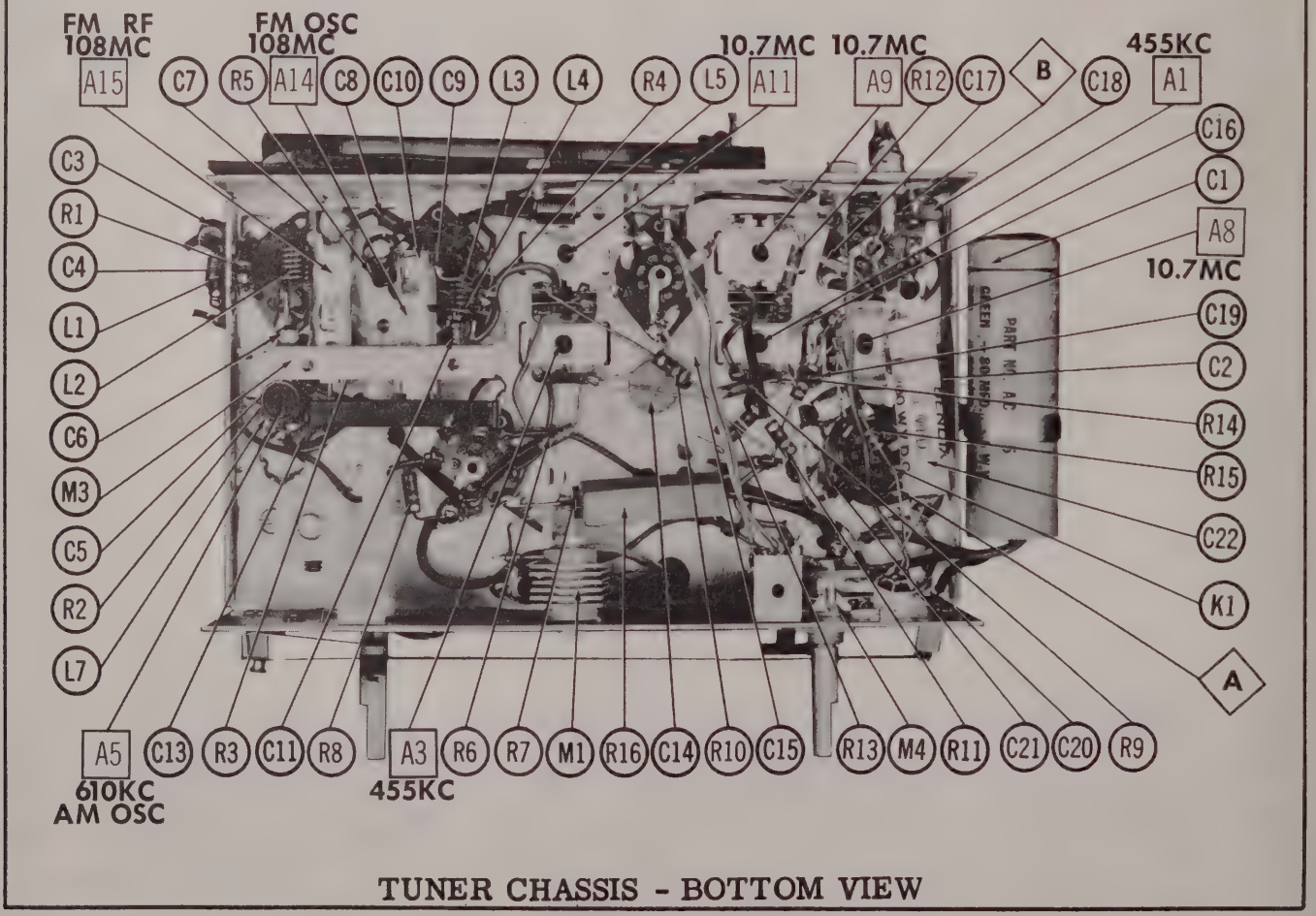
H952



SET 439 FOLDER 8




TUNER CHASSIS - TOP VIEW




TUNER CHASSIS - BOTTOM VIEW

# ALIGNMENT INSTRUCTIONS

| ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT |
|---|
| Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.<br>Use an insulated alignment screwdriver for adjusting.<br>Loop stick (L6) should be connected for alignment. |

AM ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .1mfd | High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis. | 455KC (400∿ Mod.) | AM | Tuning gang fully open | DC probe to point Ⓐ. Common to chassis. | A1, A2, A3, A4, | Adjust for maximum deflection. |
| 2. | | Loop | 610KC | AM | Tune to 610KC signal | DC probe to point Ⓐ. Common to chassis. | A5 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Rock tuning gang while adjusting. |
| 3. | | Loop | 1650KC | AM | Tuning gang fully open | DC probe to point Ⓐ. Common to chassis. | A6, A7 | Adjust for maximum deflection. Repeat steps 1, 2, & 3. |

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .1mfd | High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (Unmod.) | FM | Point of non-interference | DC probe to point Ⓑ. Common to chassis. | A8, A9, A10, A11, A12 | Adjust for maximum deflection. |
| 5. | " | " | 10.7MC | " | " | DC probe to point Ⓐ. Common to point Ⓒ. | A13 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 4. | .1mfd | High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis. | 10.7MC (450KC Sweep) | FM | Point of non-interference | Vert. Amp. to point Ⓑ. Low side to chassis. | A8, A9, A10, A11, A12 | Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. |
| 5. | " | " | 10.7MC | " | " | Vert. Amp. to point Ⓐ. Low side to chassis. | A13 | Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines. |

FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | 10mmf | High side to FM antenna terminal. Low side to chassis. | 108MC | FM | 108MC | DC probe to point Ⓑ. Common to chassis. | A14, A15 | Adjust for maximum deflection. |
| 7. | " | " | 88MC | FM | 88MC | DC probe to point Ⓑ. Common to chassis. | L2, L3 | Compress or expand coil turns for maximum deflection. Repeat steps 6 and 7 until no further improvement is noted. |

FIG. 1

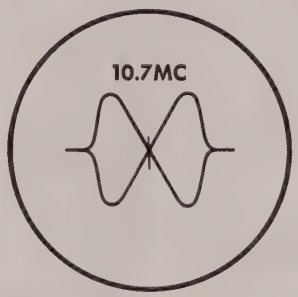


FIG. 2

# TUNER PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | FM RF Amplifier | 6BA6 | |
| V2 | FM Mixer-FM Osc. | 12AT7 | |
| V3 | AM Converter | 6BE6 | |
| V4 | 1st FM-AM IF Amplifier | 6BA6 | |
| V5 | 2nd FM IF Amp-AM Det-AVC | 6BA6 | |
| V6 | Ratio Detector | 6AL5 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | WHITLEY PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1A | 80 | 150 | 41-5 | PRS150V8050 | BBRD8515 | TCD498 | TDLD-12 | TVA-2462 | |
| B | 50 | 150 | | | | | | | |
| C2 | 2 | 50 | C-502 | PRS50V2 | BBR2-50 | TT150X2 | TD-2-50 | TVA-1301 | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | WHITLEY PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C3 | 10 | | 10% | C-504 | NPO-SI 10 | D6-100 | L10Q1 | ZT-541 | 5TCC-Q1 | |
| C4 | 50 | | 5% | C-503 | SI 50 | D6-500 | LT6Q5 | UC-545 | 5GA-Q5 | |
| C5 | 1000 | | | | | | | | | |
| C6 | 1000 | | | | | | | | | |
| C7 | 1500 | | | C-499 | BPD-0015 | DD-152 | BYA10D15 | DC5215 | 5HK-D15 | |
| C8 | 1500 | | | C-651 | BPD-0015 | DD-152 | BYA10D15 | DC5215 | 5HK-D15 | |
| C9 | 80 | | N1400 10% | C-518 | | | | | | |
| C10 | 9.5 | | N150 10% | | | | | | | ① |
| C11 | 2000 | | | | | | | | | |
| C12 | 1500 | | | C-651 | BPD-0015 | DD-152 | BYA10D15 | DC5215 | 5HK-D15 | |
| C13 | 5 | | N1400 10% | | | | | | | |
| C14 | 10000 | | | C-500 | BPD-01 | DD-103 | BYA6S1 | DC511 | 5HK-S1 | |
| C15 | 4700 | | | | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | ② |
| C16 | 680 | | N1400 10% | C-626 | | | | | | |
| C17 | 4700 | | 10% | | BPD-0047 | DD-472 | BYA10D47M | B-247 | 5HK-D47 | ② |
| C18 | 220 | | 10% | C-544 | BPD-00022 | DD-221 | L10T22 | UC-5322 | 5GA-T22 | |
| C19 | 1500 | | | C-651 | BPD-0015 | DD-152 | BYA10D15 | DC5215 | 5HK-D15 | |
| C20 | .1 | 200 | | C-543 | P288N-1 | DF-104 | CUB2P1 | GEM-201 | 2TM-P1 | |
| C21 | 10000 | | | C-500 | BPD-01 | DD-103 | BYA6S1 | DC511 | 5HK-S1 | |
| C22 | 1500 | | | C-651 | BPD-0015 | DD-152 | BYA10D15 | DC5215 | 5HK-D15 | ③ |

① Some versions may use 8.5mmf in this application (Part #C-501).
② Some versions may use 5000mmf in this application.
③ Not used in some versions.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | WHITLEY PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R1 | 470K | | R-486 | |
| R2 | 330Ω | | R-492 | |
| R3 | 100Ω | | R-653 | Note 1 |
| R4 | 470K | | R-486 | Note 1 |
| R5 | 10K | | R-490 | |
| R6 | 2.7meg | | R-583 | |
| R7 | 8200Ω | 2 | R-651 | |
| R8 | 22K | | R-497 | |
| R9 | 2.7meg | | R-583 | |
| R10 | 330Ω | | R-492 | |
| R11 | 330Ω | | R-492 | |
| R12 | 100K | | | Note 1 |
| R13 | 470K | | R-486 | |
| R14 | 330Ω | | R-492 | |
| R15 | 33K | | R-494 | Note 2 |
| R16 | 900Ω | 7 | R-488 | |

Note 1. Not used in some versions.
Note 2. Some versions may use 47K in this application.

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | WHITLEY PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | |
| L1 | FM Ant. Coil | L-477 | 19-1000 | BC-561 | 4602 | | |
| L2 | FM RF Coil | 10-15 | | | | | |
| L3 | FM Osc. (Pri.) | 18-13 | | | | | |
| L4 | FM Osc. (Sec.) | 18-14 | | | | | |
| L5 | Fil. Choke | 18-3 | 19-1002 | BC-563 | 4606 | | 2.2 Microhenries |
| L6 | Loopstick | 18-6 | | | | | |
| L7 | AM Osc. Coil | 18-12-1 | 14-1073 | BC-393 | 69-OSC | | |
| L8 | 1st FM IF Trans. | 28-1 | 16-3487 | FM-254 | 1463 | | |
| L9 | 1st AM IF Trans. | L-576 | 16-6758 | BC-352 | 12-C1 | RF-1 | |
| L10 | 2nd FM IF Trans. | 28-2 | 16-3487 | FM-254 | 1463 | | |
| L11 | 2nd AM IF trans. | L-576 | 16-6758 | BC-353 | 12-C2 | RF-2 | |
| L12 | Ratio Detector | L-473 | 17-3498 | FM-255 | 1465 | | |

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | WHITLEY PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117V @ .28A | 120V @ .042A Tap @ 6V @ 1.7A | | T-545E | | | | | | |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | WHITLEY PART No. | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Ratio Det. Plate Filter | 1500mmf, 22K | | |

## SELENIUM RECTIFIER

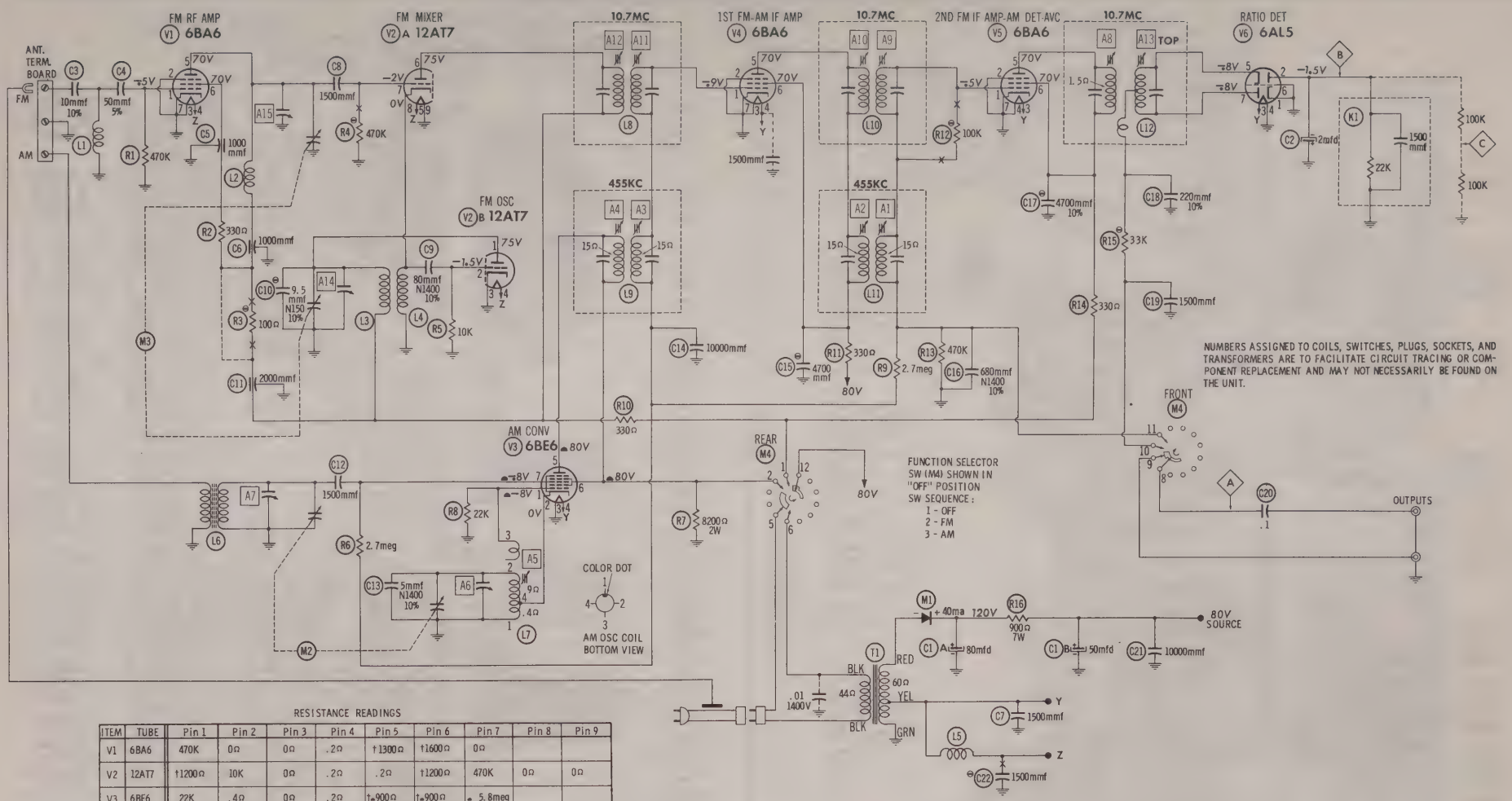
| ITEM No. | RATING | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | CURRENT (Measured) | WHITLEY PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | |
| M1 | .042A | B-538 | 1234AH | T065 SD-94① | K200① | ① Silicon Type |

## MISCELLANEOUS

| ITEM No. | PART NAME | WHITLEY PART No. | NOTES |
|---|---|---|---|
| M2 | Tuning Cap. | 46-3 | 2 Gang, Ant. 11-238mmf, Osc. 11-115mmf |
| M3 | Tuner | TU-3 | FM, Less Tuning Slugs |
| | Tuning Slugs | SA-2 | FM RF And Osc. |
| M4 | Switch | 21-3 | Function, 3 Position, Rotary. Wafer Type |

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) .....Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BA6 | 470K | 0Ω | 0Ω | .2Ω | †1300Ω | †1600Ω | 0Ω | | |
| V2 | 12AT7 | †1200Ω | 10K | 0Ω | .2Ω | .2Ω | †1200Ω | 470K | 0Ω | 0Ω |
| V3 | 6BE6 | 22K | .4Ω | 0Ω | .2Ω | †▲900Ω | †▲900Ω | ▲ 5.8meg | | |
| V4 | 6BA6 | 3meg | 0Ω | 0Ω | .2Ω | †1200Ω | †1200Ω | 0Ω | | |
| V5 | 6BA6 | 470K | 0Ω | .2Ω | 0Ω | †1200Ω | †1200Ω | 0Ω | | |
| V6 | 6AL5 | 0Ω | 22K | .2Ω | 0Ω | INF. | 0Ω | INF. | | |

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▲ MEASURED IN "AM" POSITION
† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

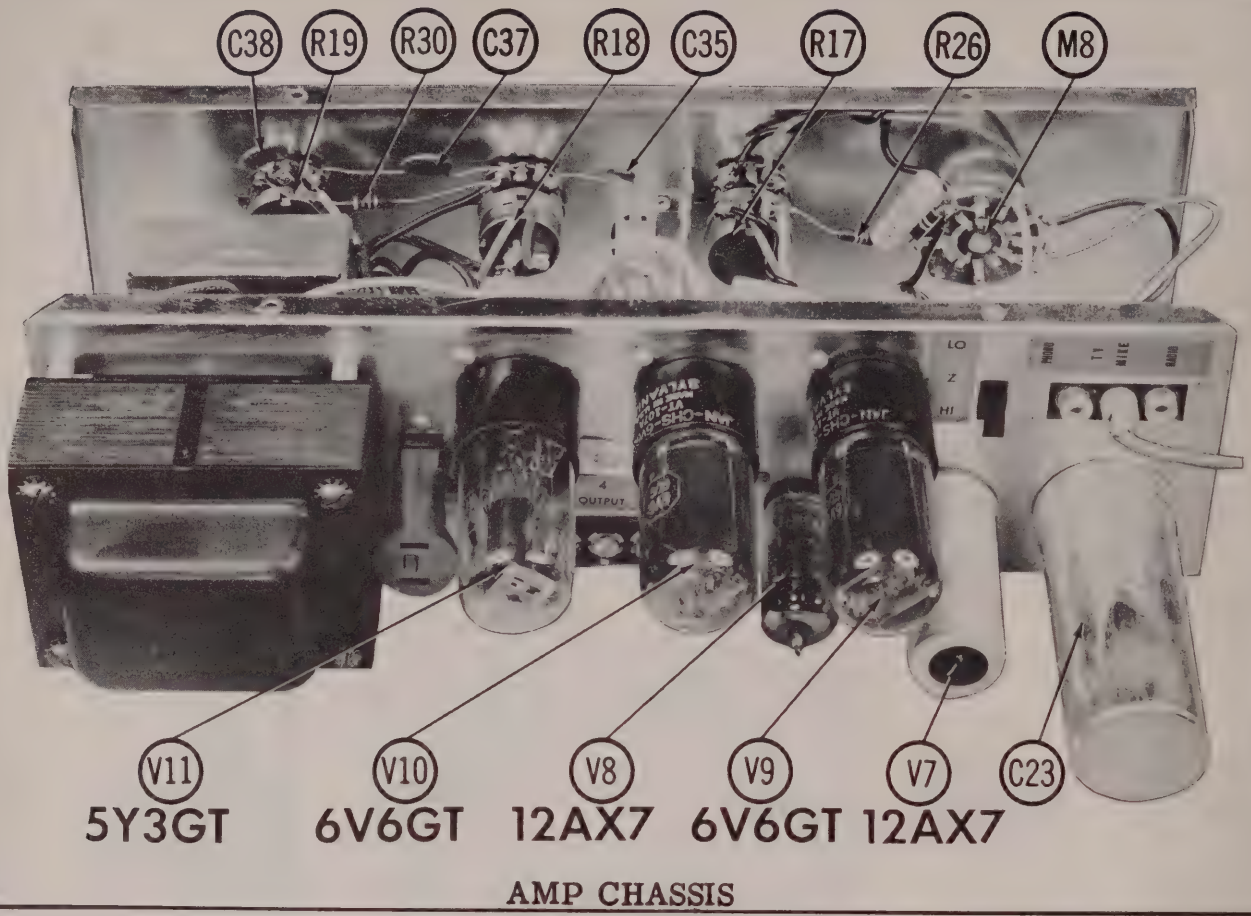
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

**MURASONDE MODEL 8125, L8200, L8400, SA8200, SA8400, ST8200, ST8400**

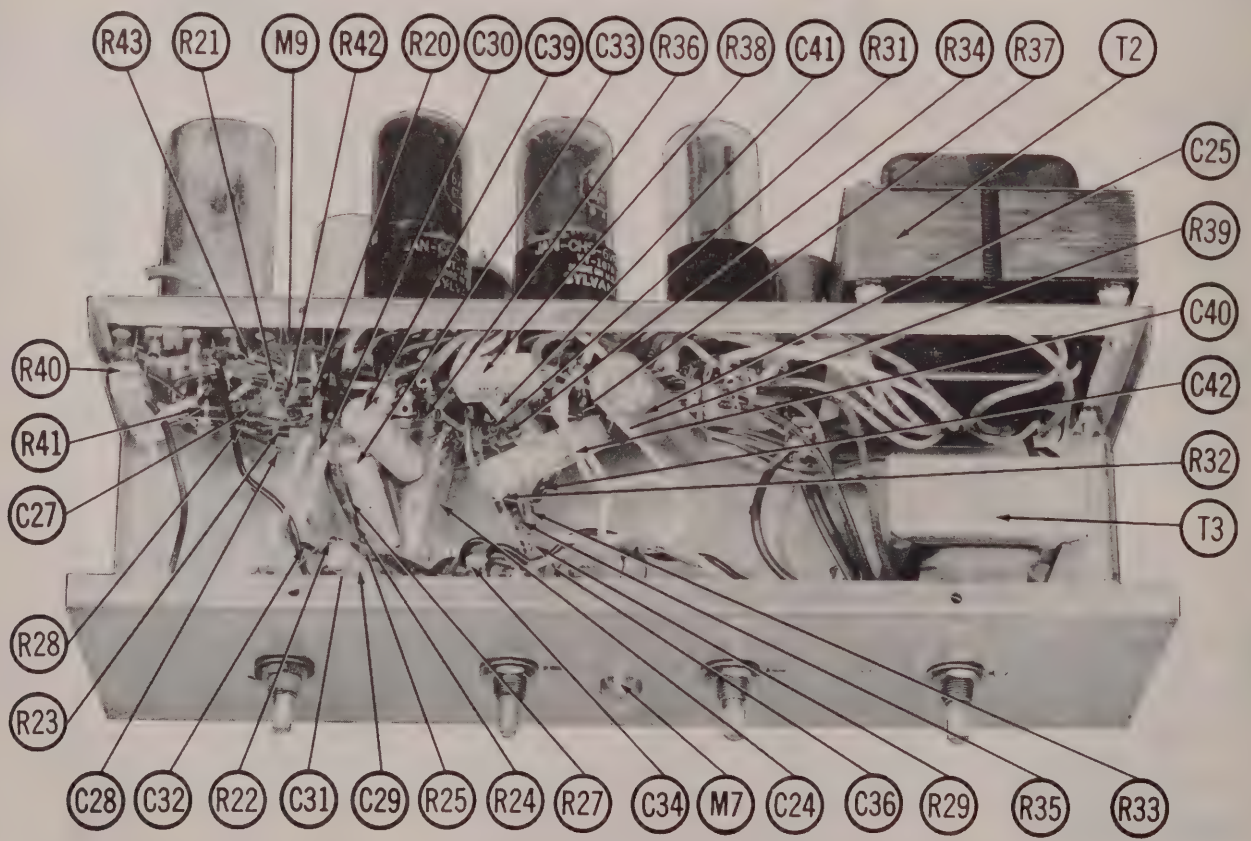
# TUNER SCHEMATIC

MODEL 8125

MURASONDE




AMP CHASSIS




AMP CHASSIS

# AMP PARTS LIST & DESCRIPTION

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V7 | AF Amplifier | 12AX7 | |
| V8 | AF Amp. -Phase Inv. | 12AX7 | |
| V9 | Output | 6V6GT | |
| V10 | Output | 6V6GT | |
| V11 | Rectifier | 5Y3GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA WHITLEY PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C23A | ▲60 | 350 | | | D0032 | FP377.4 | TMQ-18 | TVLS-4635.5* | |
| B | ■55 | 350 | | | BR1235 | TC68 | TD-60-350 | | |
| C | ▲10 | 350 | | | | | | | |
| D | 10 | 350 | | | | | | | |
| C24 | 50 | 25 | | PRS25V50 | BBR50-25 | TC29 | TD-50-25 | TVA-1206 | |
| C25 | 50 | 25 | | PRS25V50 | BBR50-25 | TC29 | TD-50-25 | TVA-1206 | |
| C26 | 2 | 50NP | | NP-PRS50V2 | BBR4-50 † BBR4-50 | TC502 | TD-4-50 † TD-4-50 | TVAS-1301.1* | |

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
† Connect negative leads together.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA WHITLEY PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C27 | 150 | | | | DI-150 | DD-151 | L10T15 | B-315 | 5GA-T15 | |
| C28 | 1000 | | | | DI-1000 | DD-102 | L10D1 | B-210 | 5GA-D1 | |
| C29 | .01 | 400 | | | P488N-01 | D6-103 | CUB4S1 | GEM-411 | 4TM-S1 | |
| C30 | .022 | 400 | | | P488N-022 | DD-203 | CUB4S2 | GEM-4122 | 4TM-S22 | |
| C31 | 150 | | | | DI-150 | DD-151 | L10T15 | B-315 | 5GA-T15 | |
| C32 | 220 | | | | DI-220 | DD-221 | L10T22 | B-322 | 5GA-T22 | |
| C33 | .022 | 400 | | | P488N-022 | DD-203 | CUB4S2 | GEM-4122 | 4TM-S22 | |
| C34 | .022 | 400 | | | P488N-022 | DD-203 | CUB4S2 | GEM-4122 | 4TM-S22 | |
| C35 | 470 | | | | DI-470 | DD-471 | L10T47 | B-347 | 5GA-T47 | |
| C36 | 4700 | | | | DI-4700 | DD-472 | L10D47 | B-247 | 5GA-D47 | |
| C37 | 4700 | | | | DI-4700 | DD-472 | L10D47 | B-247 | 5GA-D47 | |
| C38 | 4700 | | | | DI-4700 | DD-472 | L10D47 | B-247 | 5GA-D47 | |
| C39 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C40 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C41 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C42 | 470 | | | | DI-470 | DD-471 | L10T47 | B-347 | 5GA-T47 | |

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA WHITLEY PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R17A | 500K | ½ | 220005 | BB-104 | AD47-500K-Z | Q13-133 | | Loudness |
| B | 500K | ½ | | Not Req. | Not Req. | M13-133 | | Loudness |
| C | Shaft | | | Not Req. | FS-3 | Not Req. | | |
| R18A | 100K | ½ | 220001 | B-40 | A47-100K-S | Q11-128 | U41 | Treble |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |
| C | Switch | | | KR-1or | SWE-12 | 76-1 | US-26 | |
| R19A | 1meg | ½ | 220002 | B-69 | A47-1meg-S | Q11-137 | U5 | Bass |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | WHITLEY PART No. | NOTES |
|---|---|---|---|---|
| R20 | 12meg | | | |
| R21 | 120K | | | |
| R22 | 150K | | | |
| R23 | 68K | | | |
| R24 | 1500Ω | | | |
| R25 | 220K | | | |
| R26 | 27K | | | |
| R27 | 1500Ω | | | |
| R28 | 100K | | | |
| R29 | 220K | | | |

## RESISTORS (cont)

| ITEM No. | RATING OHMS | RATING WATT | WHITLEY PART No. | NOTES |
|---|---|---|---|---|
| R30 | 47K | | | |
| R31 | 470K | | | |
| R32 | 2200Ω | | | |
| R33 | 22K | | | |
| R34 | 470K | | | |
| R35 | 5600Ω 5% | | | |
| R36 | 470K 5% | | | |
| R37 | 470K | | | |
| R38 | 250Ω 5% | | | |
| R39 | 68K | | | |
| R40 | 400Ω | 7 | | |
| R41 | 8200Ω | 2 | | |
| R42 | 47K | 2 | | |
| R43 | 10K | | | |

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | RATING SEC. 4 | RATING SEC. 5 | REPLACEMENT DATA WHITLEY PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T2 | 117V @ 76A | 700 VCT @ .100A | 5V @ 2A | 6.3 VCT @ 1.8A | | | 300001 | P9311 | P-2952 | | PM8409 | 24R04 | R-11B |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA WHITLEY PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T3 | 5300Ω CT | 8Ω Tap @ 4Ω | 35002 | Z1011 | A-2904 ① | AU-609 | A-3830 | 24S55 | S-57Z | ① Drill new mounting hole |

## SPEAKER

| ITEM No. | TYPE SIZE | TYPE FIELD | TYPE V. C. IMP. | REPLACEMENT DATA WHITLEY PART No. | REPLACEMENT DATA QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 12" | PM | 6-8Ω | V12J65 ① | 12A10X | ① Used in Model ST8200 Some models use two 12" speakers and three 5" speakers. |
| SP2 | 5" | PM | 10Ω | V506 ① | | |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA WHITLEY PART No. | ASTATIC PART No. CARTRIDGE | ASTATIC PART No. NEEDLE | JENSEN PART No. CARTRIDGE | JENSEN PART No. NEEDLE | REMARKS |
|---|---|---|---|---|---|---|
| M5 | | 89-TB | | | | |

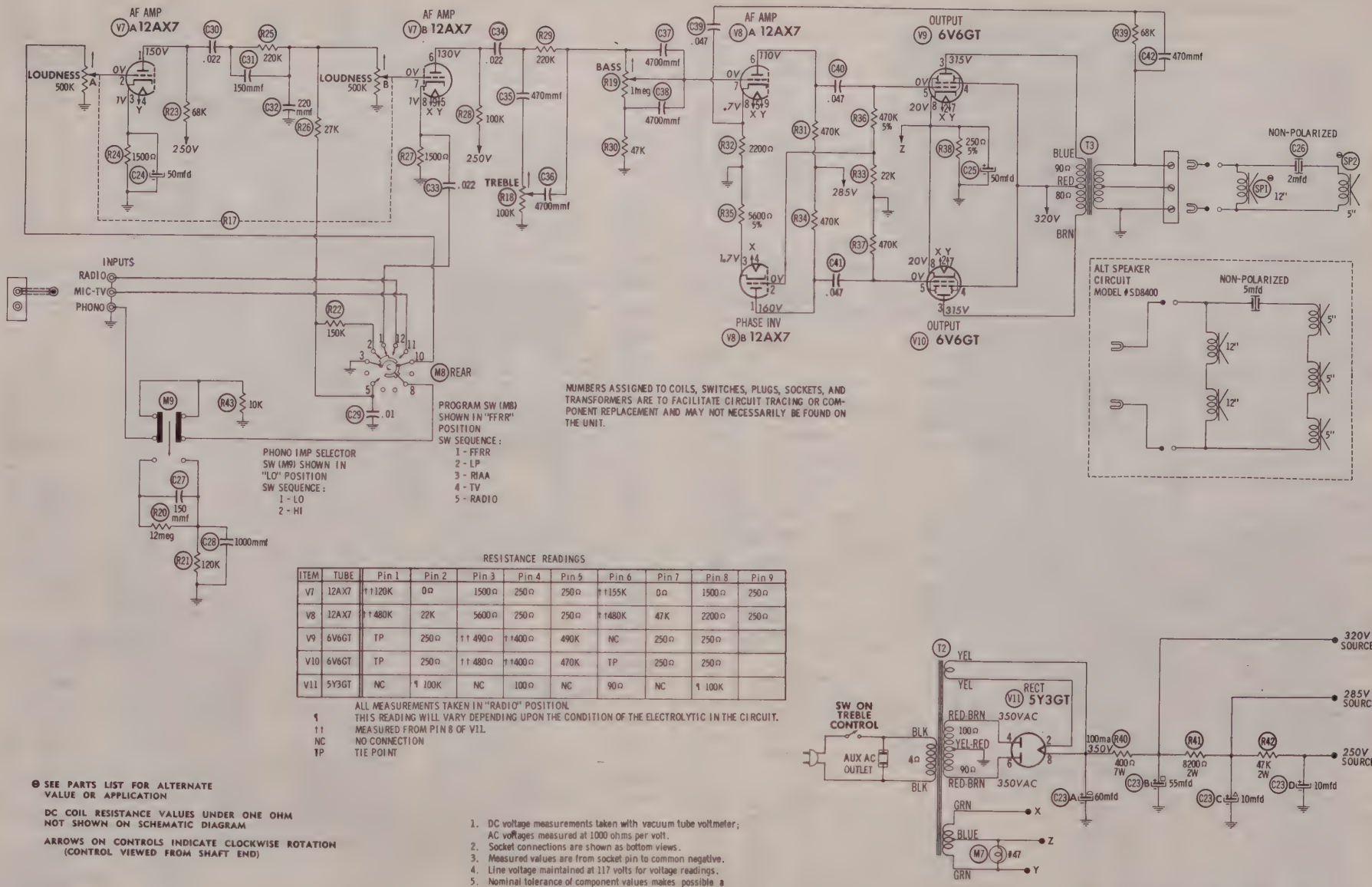
## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

| ITEM No. | REPLACEMENT DATA WHITLEY PART No. | JENSEN PART No. | WALCO PART No. | REMARKS |
|---|---|---|---|---|
| M6 | | † S-61 or †♦ S-61SD or ♦ S-61D | † W-77TPS or †♦ W-77DS or ♦ W-77TPD | † Jewel ♦ Diamond |

## MISCELLANEOUS

| ITEM No. | PART NAME | WHITLEY PART No. | NOTES |
|---|---|---|---|
| M7 | Lamp | | #47 |
| M8 | Switch | | Program Selector (5 Position, Rotary Wafer Type) |
| M9 | Switch | | Input Imp. Selector (DPDT, Slide Type) |




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V7 | 12AX7 | ††120K | 0Ω | 1500Ω | 250Ω | 250Ω | ††155K | 0Ω | 1500Ω | 250Ω |
| V8 | 12AX7 | ††480K | 22K | 5600Ω | 250Ω | 250Ω | ††480K | 47K | 2200Ω | 250Ω |
| V9 | 6V6GT | TP | 250Ω | ††490Ω | ††400Ω | 490K | NC | 250Ω | 250Ω | |
| V10 | 6V6GT | TP | 250Ω | ††480Ω | ††400Ω | 470K | TP | 250Ω | 250Ω | |
| V11 | 5Y3GT | NC | ¶ 100K | NC | 100Ω | NC | 90Ω | NC | ¶ 100K | |

ALL MEASUREMENTS TAKEN IN "RADIO" POSITION.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
†† MEASURED FROM PIN 8 OF V11.
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

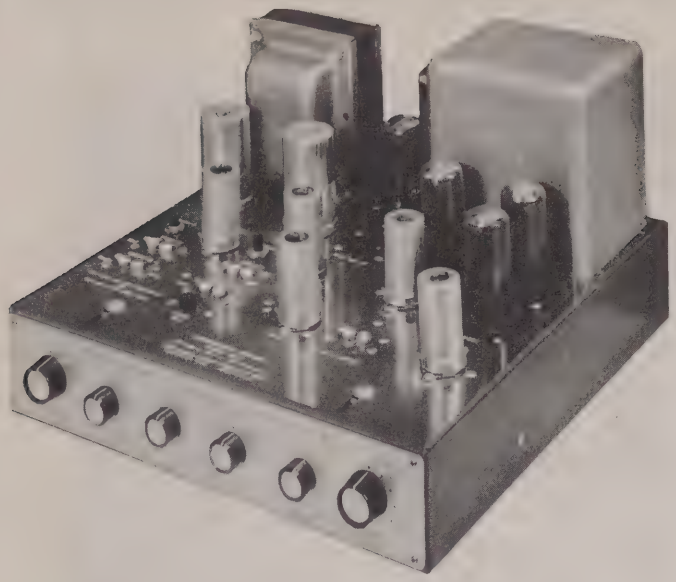
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1959

**MURASONDE MODEL 8125, L8200, L8400 SA8200, SA8400, ST8200, ST8400**

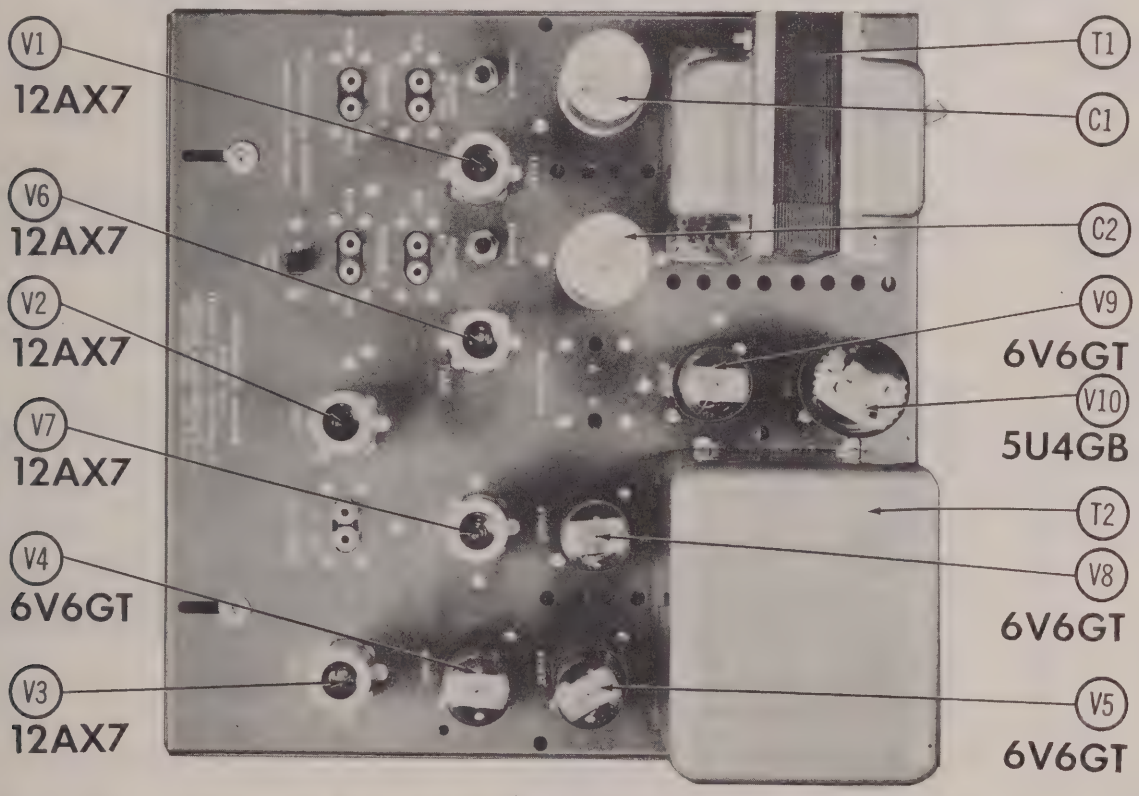
# AMP SCHEMATIC

PHOTOFACT* Folder





| | |
|---|---|
| TRADE NAME | Newcomb Model 3D12 |
| MANUFACTURER | Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, California |
| TYPE SET | AC Operated 10 Tube Stereo Amplifier |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles RATING 130 Watts, 1.1 Amp. @117 Volts AC |




NEWCOMB
MODEL 3D12

NEWCOMB
MODEL 3D12

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H948



SET 439 FOLDER 9

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE |
|---|---|---|
| V1 | Channel "A" Preamp. | ECC83/12AX7 ① |
| V2 | Channel "A" AF Amp. - Channel "B" AF Amp. | ECC83/12AX7 ① |
| V3 | Channel "A" AF Amp. - Phase Inv. | ECC83/12AX7 ① |
| V4 | Channel "A" Output | 6V6GT |
| V5 | Channel "A" Output | 6V6GT |
| V6 | Channel "B" Preamp. | ECC83/12AX7 ① |
| V7 | Channel "B" AF Amp. - Phase Inv. | ECC83/12AX7 ① |
| V8 | Channel "B" Output | 6V6GT |
| V9 | Channel "B" Output | 6V6GT |
| V10 | Rectifier | 5U4GB |

① Domestic type listed may not be directly interchangeable in some instances

## ELECTROLYTIC CAPACITORS

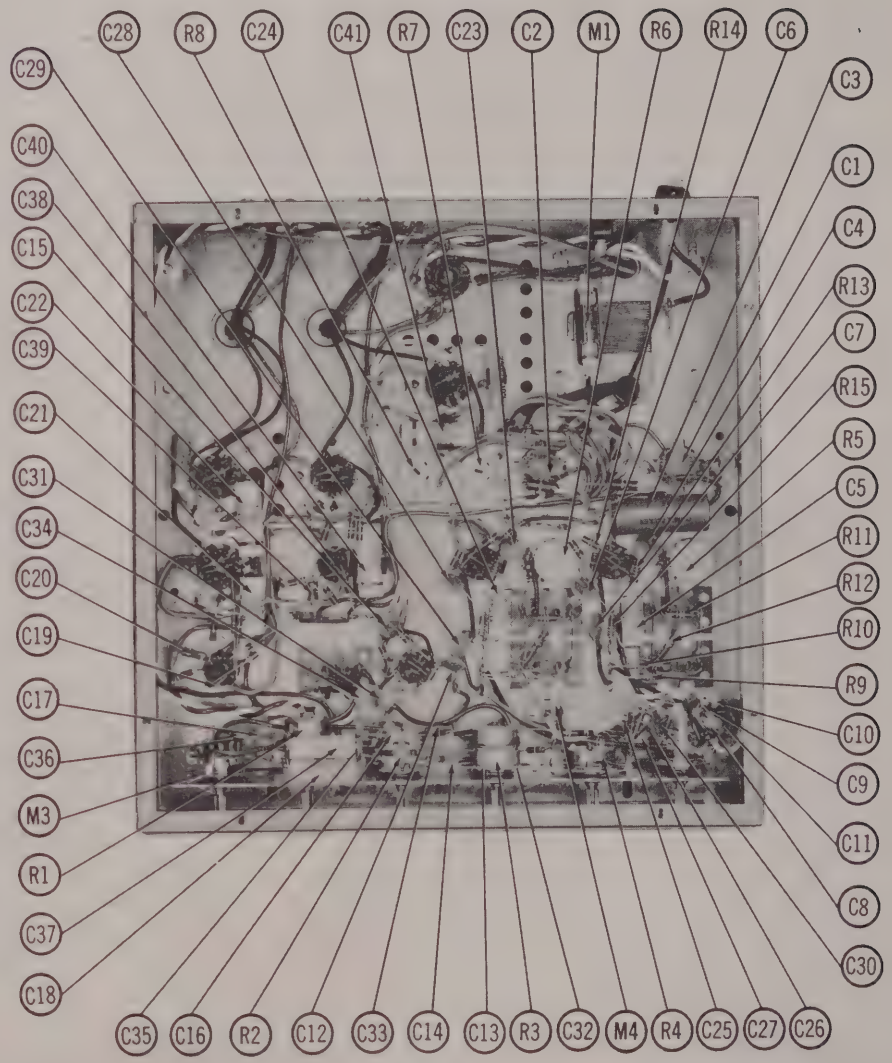
| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | NEWCOMB PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
| C1A | ▲20 | 475 | CE-30 | AFH4-19-10 | D0179.3 | FP474.5 | TMQ-19 TMS-17 | TVL-4832 | |
| B | ▲10 | 475 | | | | | | | |
| C | ■10 | 475 | | | | | | | |
| D | 25 | 50 | | | | | | | |
| C2A | ▲20 | 475 | CE-30 | AFH4-19-10 | D0179.3 | FP474.5 | TMQ-19 TMS-17 | TVL-4832 | |
| B | ■10 | 475 | | | | | | | |
| C | ▲10 | 475 | | | | | | | |
| D | 25 | 50 | | | | | | | |
| C3 | 8 | 500 | | PRS500V8 | BR850 | TC82 | TD-8-500 | TVA-1902 | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | NEWCOMB PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C4 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | ① |
| C5 | .022 | 600 | | | P688N-022 | DD-203 | CUB6S22 | GEM-6122 | 6TM-S22 | |
| C6 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C7 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C8 | 300 | | 10% | | 1469-0003 | TCZ-300 | 5R5T3 | MCB-241 | MS-33 | |
| C9 | 470 | | 10% | | 1464-00047 | | 5R5T47 | | MS-347 | |
| C10 | 470 | | 10% | | 1464-00047 | | 5R5T47 | | MS-347 | |
| C11 | 1600 | | 10% | | BPD-0015 | DD-162 | BYA10D15 | JL-215 | 5GA-D16S 10%* | ② |
| C12 | 5000 | | | | BPD-005 | DD-502 | BYA10D5 | B-250 | 5HK-D5 | |
| C13 | 1500 | | 10% | | 1464-0015 | | 1R5D15 | MCB-255 | MS-215 | |
| C14 | 1000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C15 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C16 | 750 | | 10% | | 1464-00075 | | 1R5T75 | | MS-375 | |
| C17 | 47 | | 10% | | NPO-S1 47 | TCZ-47 | C10Q47C | | MS-447 | |
| C18 | .022 | 600 | | | P688N-022 | DD-203 | CUB6S22 | GEM-6122 | 6TM-S22 | |
| C19 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | ③ |
| C20 | 15 | | 10% | | NPO-S1 15 | TCZ-15 | C10Q15C | | MS-415 | |
| C21 | .047 | 600 | | | P688N-047 | DF-503 | CUB6S47 | GEM-6147 | 6TM-S47 | |
| C22 | .047 | 600 | | | P688N-047 | DF-503 | CUB6S47 | GEM-6147 | 6TM-S47 | |
| C23 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | ① |
| C24 | .022 | 600 | | | P688N-022 | DD-203 | CUB6S22 | GEM-6122 | 6TM-S22 | |
| C25 | 300 | | 10% | | 1469-0003 | TCZ-300 | 5R5T3 | MCB-241 | MS-33 | |
| C26 | 470 | | 10% | | 1464-00047 | | 5R5T47 | | MS-347 | |
| C27 | 470 | | 10% | | 1464-00047 | | 5R5T47 | | MS-347 | |
| C28 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C29 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C30 | 1600 | | 10% | | BPD-0015 | DD-162 | BYA10D15 | JL-215 | 5GA-D15S 10%* | ② |
| C31 | 5000 | | | | BPD-005 | DD-502 | BYA10D5 | B-250 | 5HK-D5 | |
| C32 | 1500 | | 10% | | 1464-0015 | | 1R5D15 | MCB-255 | MS-215 | |
| C33 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C34 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |

# CHASSIS-BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## CAPACITORS (cont)

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C35 | 750 | | 10% | | 1464-00075 | | 1R5T75 | | MS-375 | |
| C36 | 47 | | 10% | | NPO-SI 47 | TCZ-47 | C10Q47C | | MS-447 | |
| C37 | .022 | 600 | | | P688N-022 | DD-203 | CUB6S22 | GEM-6122 | 6TM-S22 | |
| C38 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C39 | 15 | | 10% | | NPO-SI 15 | TCZ-15 | C10Q15C | | MS-415 | ③ |
| C40 | .047 | 600 | | | P688N-047 | DF-503 | CUB6S47 | GEM-6147 | 6TM-S47 | |
| C41 | .047 | 600 | | | P688N-047 | DF-503 | CUB6S47 | GEM-S47 | 6TM-S47 | |

① Some versions may use 20000mmf in some applications.
② Some versions may use 1500mmf in some applications.
③ Some versions may use 50000mmf in some applications.

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | NEWCOMB PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 500K | ½ | RV-79 | | | | | Volume, Tap ⓐ 200K, Chan. A |
| B | 500K | | | | | | | Volume, Tap ⓐ 200K, Chan. B |
| C | Switch | | | | | | | |
| R2A | 2meg | ½ | RV-78 | | | | | Treble, Tap ⓐ 1meg, Chan. A |
| B | 2meg | | | | | | | Treble, Tap ⓐ 1meg, Chan. B |
| R3A | 2meg | ½ | RV-80 | | | Q13-139 | | Bass, Channel A |
| B | 2meg | | | | | M13-139 | | Bass, Channel B |
| R4A | 2meg | ½ | | | A47F3-2meg | Q18-139X | UT-451 | Focus, Tap ⓐ 1.2meg |
| B | Shaft | | | | KSS-3 | Not Req. | Not Req. | |
| R5A | 50K | ½ | RV-84 | AB-32 | A47-50K-Z | B13-123 | U33 | Limiter, Channel A |
| B | Shaft | | | AK-1 | FKS-1/4 | SK2 | Not Req. | |
| R6A | 50K | ½ | RV-84 | AB-32 | A47-50K-Z | B13-123 | U33 | Limiter, Channel B |
| B | Shaft | | | AK-1 | FKS-1/4 | SK2 | Not Req. | |
| R7A | 100Ω | 2(WW) | | WN-101 | A43-100 | W11-084 | C100P | Hum Balance, Channel A |
| B | Shaft | | | Not Req. | FKS-1/4 | SK5 | Not Req. | |
| R8A | 100Ω | 2(WW) | | WN-101 | A43-100 | W11-084 | C100P | Hum Balance, Channel B |
| B | Shaft | | | Not Req. | FKS-1/4 | SK5 | Not Req. | |

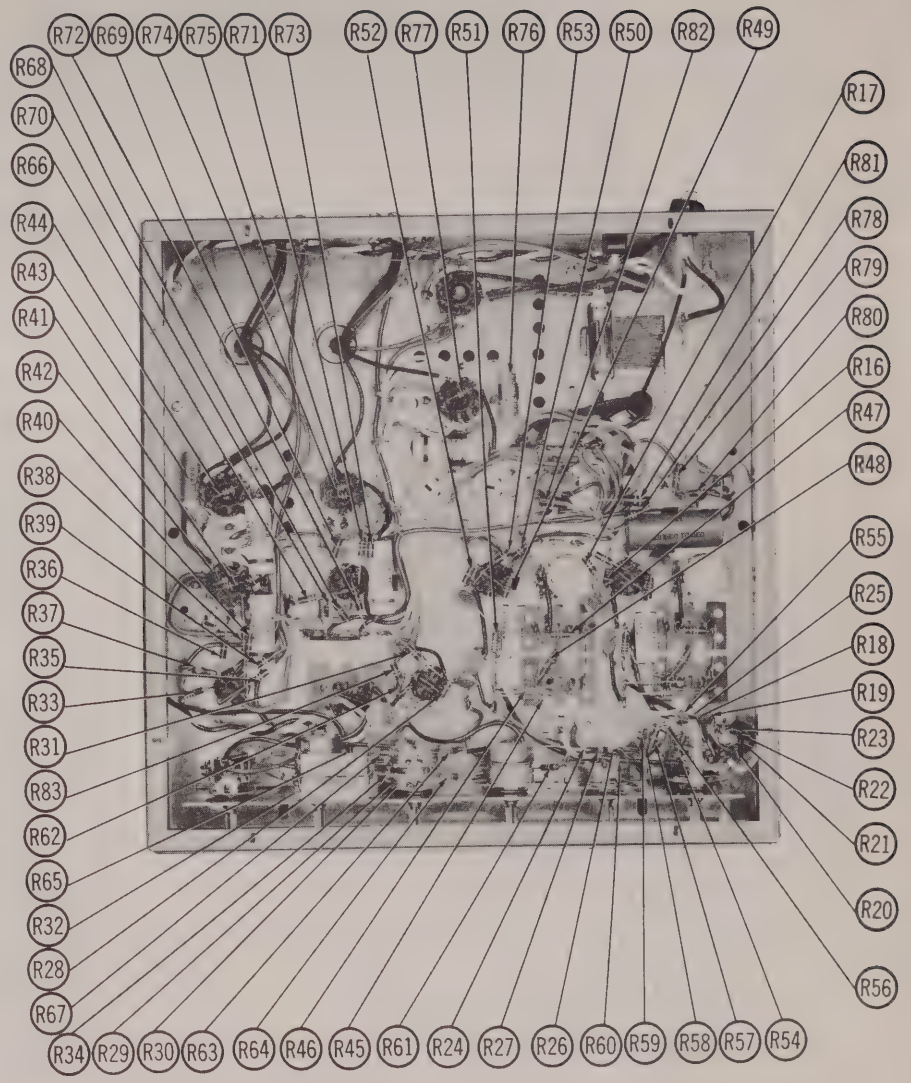
## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | NEWCOMB PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R9 | 180K | | | |
| R10 | 180K | | | |
| R11 | 56K | | | |
| R12 | 22K | | | |
| R13 | 18meg | | | |
| R14 | 100K | | | |
| R15 | 180K | | | |
| R16 | 6.8meg | | | |
| R17 | 100K | | | |
| R18 | 4.7meg | | | |
| R19 | 270K | | | |
| R20 | 3.3meg | | | |
| R21 | 1meg | | | |
| R22 | 1.5meg | | | |
| R23 | 1meg | | | |
| R24 | 100K | | | |
| R25 | 56K | | | |
| R26 | 10K | | | |
| R27 | 10K | | | |
| R28 | 6.8meg | | | |
| R29 | 330K | | | |
| R30 | 330K | | | |
| R31 | 100K | | | |
| R32 | 330K | | | |
| R33 | 39K | | | |
| R34 | 12K | | | |

| ITEM No. | RATING | | NEWCOMB PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R35 | 100K | | | |
| R36 | 2200Ω | | | |
| R37 | 22K | | | |
| R38 | 560K | | | |
| R39 | 100K | | | |
| R40 | 5600Ω | | | |
| R41 | 100K | | | |
| R42 | 470K | | | |
| R43 | 250Ω | 5 | | |
| R44 | 470K | | | |
| R45 | 180K | | | |
| R46 | 180K | | | |
| R47 | 56K | | | |
| R48 | 22K | | | |
| R49 | 18meg | | | |
| R50 | 100K | | | |
| R51 | 180K | | | |
| R52 | 6.8meg | | | |
| R53 | 100K | | | |
| R54 | 4.7meg | | | |
| R55 | 270K | | | |
| R56 | 3.3meg | | | |
| R57 | 1meg | | | |
| R58 | 1.5meg | | | |
| R59 | 1.meg | | | |

# CHASSIS—BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS (cont)

| ITEM No. | RATING OHMS | RATING WATT | NEWCOMB PART No. | NOTES |
|---|---|---|---|---|
| R60 | 56K | | | |
| R61 | 100K | | | |
| R62 | 6.8meg | | | |
| R63 | 330K | | | |
| R64 | 330K | | | |
| R65 | 330K | | | |
| R66 | 39K | | | |
| R67 | 12K | | | |
| R68 | 100K | | | |
| R69 | 2200Ω | | | |
| R70 | 22K | | | |
| R71 | 560K | | | |

| ITEM No. | RATING OHMS | RATING WATT | NEWCOMB PART No. | NOTES |
|---|---|---|---|---|
| R72 | 100K | | | |
| R73 | 5600Ω | | | |
| R74 | 100K | | | |
| R75 | 470K | | | |
| R76 | 250Ω | 5 | | |
| R77 | 470K | | | |
| R78 | 56K | | | |
| R79 | 56K | | | |
| R80 | 10K | | | |
| R81 | 15K | | | |
| R82 | 2200Ω | 1 | | |
| R83 | 100K | 1 | | |

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA NEWCOMB PART No. FUSE | NEWCOMB PART No. HOLDER | LITTELFUSE PART No. FUSE | LITTELFUSE PART No. HOLDER | BUSS PART No. FUSE | BUSS PART No. HOLDER |
|---|---|---|---|---|---|---|---|---|
| M1 | AGC | 2A 250V | | | 312002. (2A 250V ) | 356001 | AGC2 | 4406 |

## MISCELLANEOUS

| ITEM No. | PART NAME | NEWCOMB PART No. | NOTES |
|---|---|---|---|
| M2 | Switch | SY-83 | Phono Crossover (5 Position, Rotary Wafer Type) |
| M3 | Switch | SY-78 | Channel Selector (5 Position, Rotary Wafer Type) |
| M4 | Switch | | Equilazation, Cook-BN (SPST, Slide Type) |

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | REPLACEMENT DATA NEWCOMB PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117V @ 1.10A | 670 VCT @.180A | 5V @ 3A | TR-203 | | | | | | |
| | SEC. 3 | SEC. 4 | SEC. 5 | | | | | | | |
| | 6.3V @ 1.55A | 6.3V @ 1.25A | | | | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA NEWCOMB PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T2A | 9400Ω CT | 16Ω Tap @ 8Ω | TR-182 | | | | | | | |
| T2B | 9400Ω CT | 16Ω Tap @ 8Ω | | | | | | | | |

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

## ADJUSTMENTS

HUM BALANCE (R7 & R8)

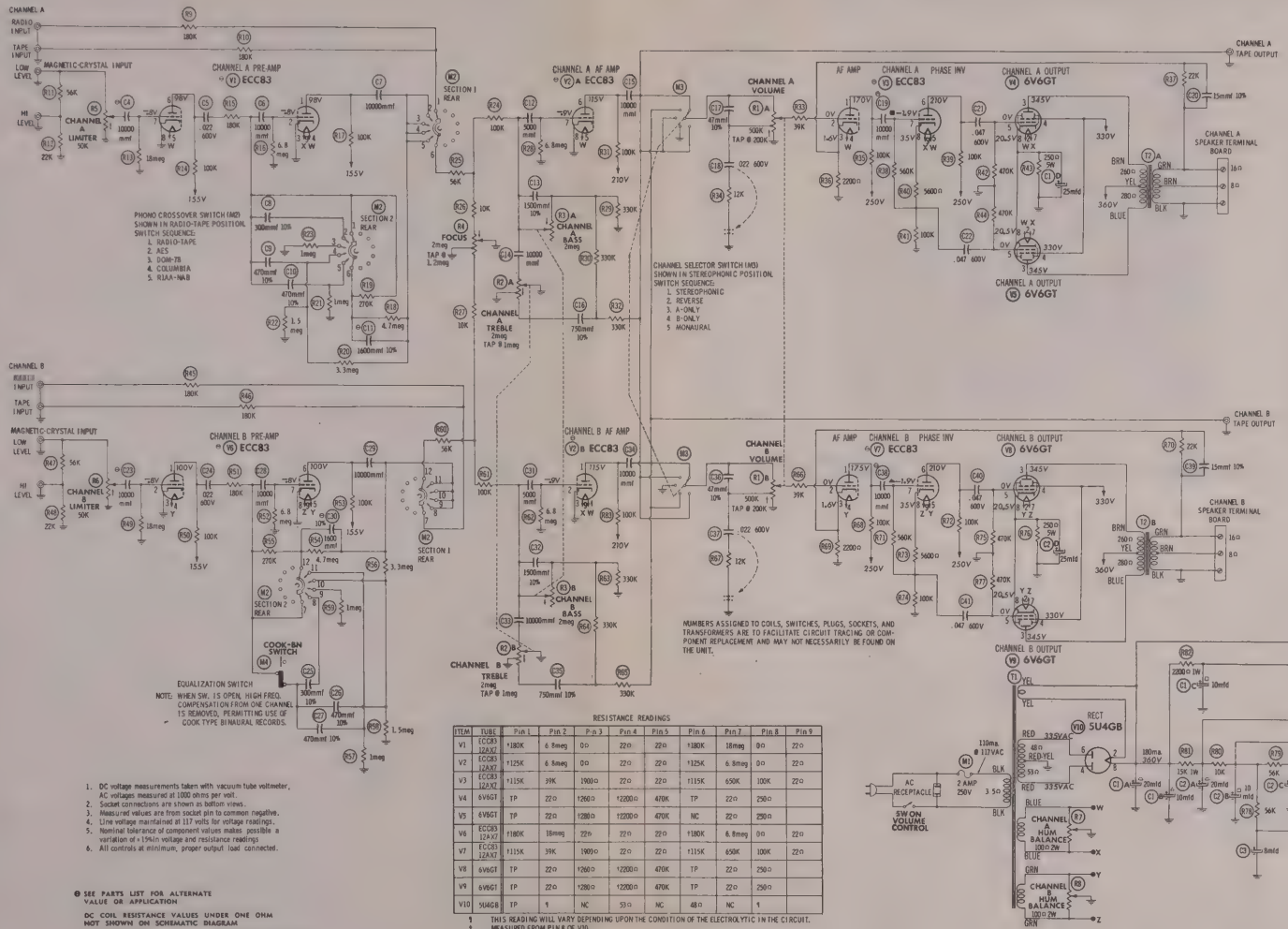
Set Phono Crossover Switch to AES, volume and limiter controls fully clockwise. Turn Channel Selector to "A-Only" and adjust A Hum Balance for minimum hum. Turn Channel Selector to "B-Only" and adjust B Hum Balance for minimum hum.

FOCUS (R4)

Turn control CCW to reduce gain of Channel A, and clockwise to reduce gain of Channel B.

LIMITER (R5 & R6)

Set Focus control to its mid-position. Play a stereo-LP record and switch from A-Only to B-Only. Adjust the Limiter control of the loudest channel until both channels are approximately equal in gain.




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | ECC83 / 12AX7 | †180K | 6.8meg | 0Ω | 22Ω | 22Ω | †180K | 18meg | 0Ω | 22Ω |
| V2 | ECC83 / 12AX7 | †125K | 6.8meg | 0Ω | 22Ω | 22Ω | †125K | 6.8meg | 0Ω | 22Ω |
| V3 | ECC83 / 12AX7 | †115K | 39K | 190Ω | 22Ω | 22Ω | †115K | 650K | 100K | 22Ω |
| V4 | 6V6GT | TP | 22Ω | †260Ω | †2200Ω | 470K | TP | 22Ω | 250Ω | |
| V5 | 6V6GT | TP | 22Ω | †280Ω | †2200Ω | 470K | NC | 22Ω | 250Ω | |
| V6 | ECC83 / 12AX7 | †180K | 18meg | 22Ω | 22Ω | 22Ω | †180K | 6.8meg | 0Ω | 22Ω |
| V7 | ECC83 / 12AX7 | †115K | 39K | 190Ω | 22Ω | 22Ω | †115K | 650K | 100K | 22Ω |
| V8 | 6V6GT | TP | 22Ω | †260Ω | †2200Ω | 470K | TP | 22Ω | 250Ω | |
| V9 | 6V6GT | TP | 22Ω | †280Ω | †2200Ω | 470K | TP | 22Ω | 250Ω | |
| V10 | 5U4GB | TP | ¶ | NC | 53Ω | NC | 48Ω | NC | ¶ | |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V10.
• MEASURED FROM PIN 8 OF V3.
▲ MEASURED FROM PIN 8 OF V7.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±5% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1959

**NEWCOMB MODEL 3D12**

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# PENTRON MODELS CS-20, PS-10

PENTRON MODELS
CS-20, PS-10

MODEL PS10

PENTRON MODELS
CS-20, PS-10

| | |
|---|---|
| TRADE NAME | Pentron Models CS-20, PS-10 |
| MANUFACTURER | Pentron Corp., 777 S. Tripp Ave., Chicago 24, Illinois |
| TYPE SET | AC Operated 4 Tube Audio Amplifier |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles RATING 62 Watts, .62 Amp. @117 Volts AC |

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H949



SET 439 FOLDER 10

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF Amp.-Phase Inv. | 6AN8 | |
| V2 | Output | 6V6GT | |
| V3 | Output | 6V6GT | |
| V4 | Rectifier | 5Y3GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA PENTRON PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲20 | 400 | | AFH3-36 | C0270 | FP376.5 | TMT-34 | TVL-3780 | |
| B | ▲20 | 400 | | | | | | | |
| C | ■20 | 400 | | | | | | | |
| C2 | 10 | 50 | | PRS50V10 | BBR10-50 | TT50X10 | TD-10-50 | TVA-1304 | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA PENTRON PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C3 | .047 | 100 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C4A | 4000 | | | | DD-402 | | | B-240 | 5HK-2D4 | Note 1 |
| B | 4000 | | | | BPD-2X004 | | BYC6DD4 | B-240 | | Note 1 |
| C5 | 220 | | | | S1 220 | D6-221 | LT6T22 | UC-5322 | 5GA-T22 | Note 2 |
| C6 | .047 | 100 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |
| C7 | .02 | 400 | | | P488N-02 | DD-203 | CUB2S2 | GEM-412 | 2TM-S2 | Note 3 |
| C8 | .047 | 100 | | | P288N-047 | DF-503 | CUB2S47 | GEM-4147 | 2TM-S47 | |

Note 1. Not used in some versions.
Note 2. Some versions may use 2000mmf in this application.
Note 3. Some versions may use .05mfd in this application.

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA PENTRON PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 500K | ½ | BA811-1274 | B-616 | A47-500K-Z | Q13-133 | U48 | Audio Level |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| R2A | 500K | ½ | BA812-538 | B-60 | A47-500K-Z | Q13-133 | U48 | Tone |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-1 or KR-1* | SWE-12 | 76-1 | US-26 | |

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

## RESISTORS

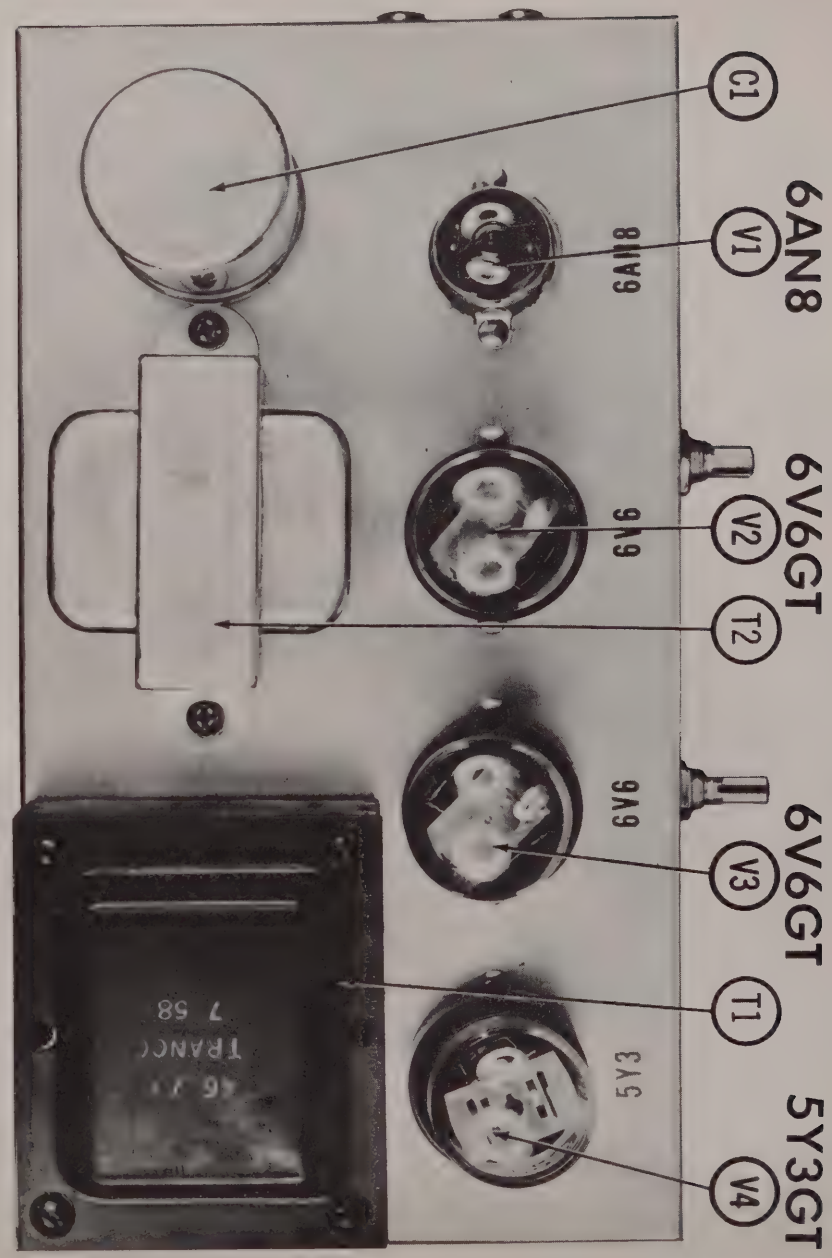
All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | PENTRON PART No. | NOTES |
|---|---|---|---|---|
| R3 | 250K | | | |
| R4 | 390K | | | |
| R5 | 1.2meg | | | |
| R6 | 680K | | | Note 1 |
| R7 | 39K 5% | 1 | | |
| R8 | 39K 5% | 1 | | |
| R9 | 100K | | | |

| ITEM No. | RATING OHMS | RATING WATT | PENTRON PART No. | NOTES |
|---|---|---|---|---|
| R10 | 250Ω | 4 | | |
| R11 | 100K | | | |
| R12 | 82K | 1 | | |
| R13 | 680Ω | | | |
| R14 | 39K 5% | 1 | | |
| R15 | 500Ω | 4 | | |

Note 1. Not used in some versions.

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | PENTRON PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117 V @ .62A | 630 VCT @ .090A | 5V @ 2A | 4670 | | | | | | |
| | SEC. 3 | SEC. 4 | SEC. 5 | | | | | | | |
| | 6.3V @ 1.4A | | | | | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | PENTRON PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 5500Ω CT | 6-8Ω | 3427 | Z1011 | A-2901 ① | AU-609 | A-3870 | 24S55 | S-55X | ① Drill new mounting hole |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | PENTRON PART No. | QUAM PART No. | |
| SP1 | 6" | PM | 3-4Ω | 345B19 | 6A1 | |
| SP2 | 6" | PM | 3-4Ω | 345-15 | 6A1 | |

## MISCELLANEOUS

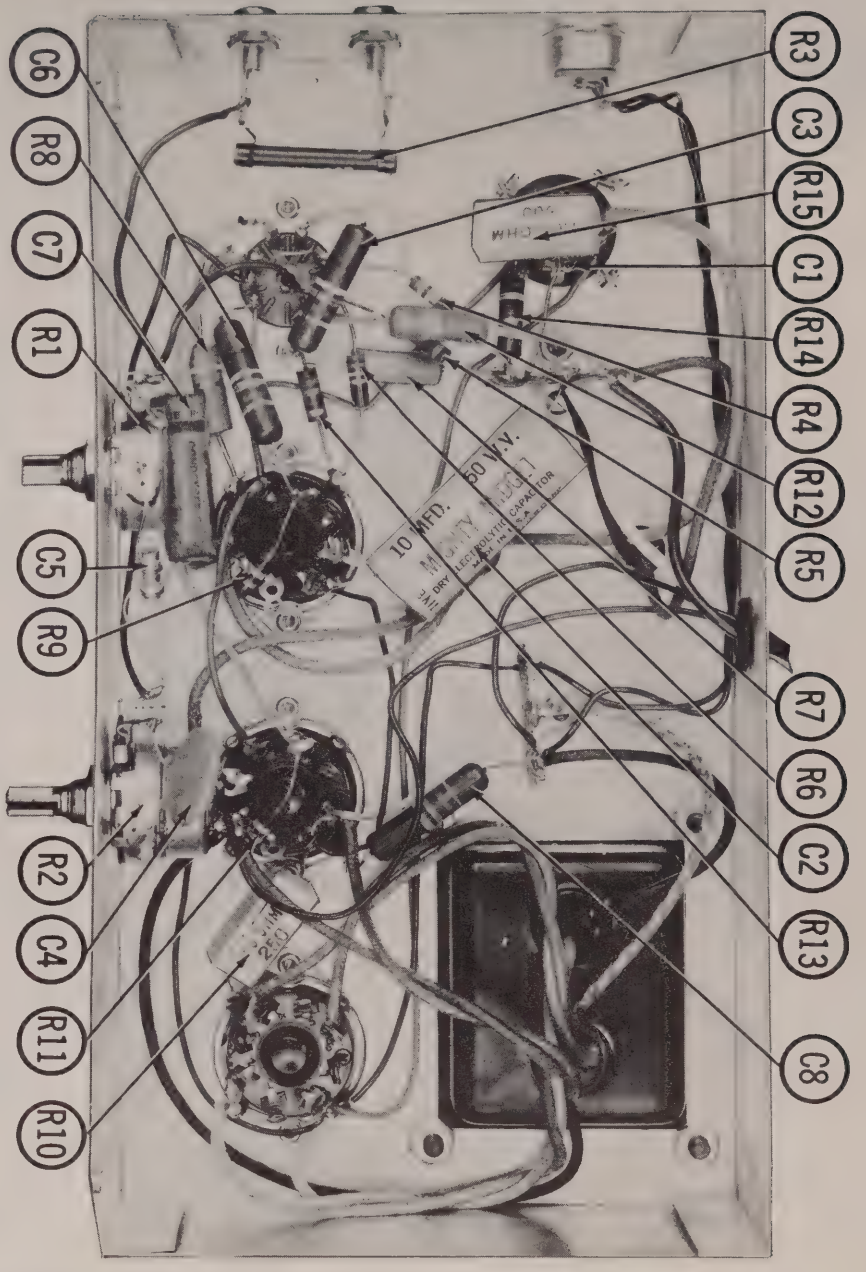
| ITEM No. | PART NAME | PENTRON PART No. | NOTES |
|---|---|---|---|
| M1 | Lamp | | NE-2 |

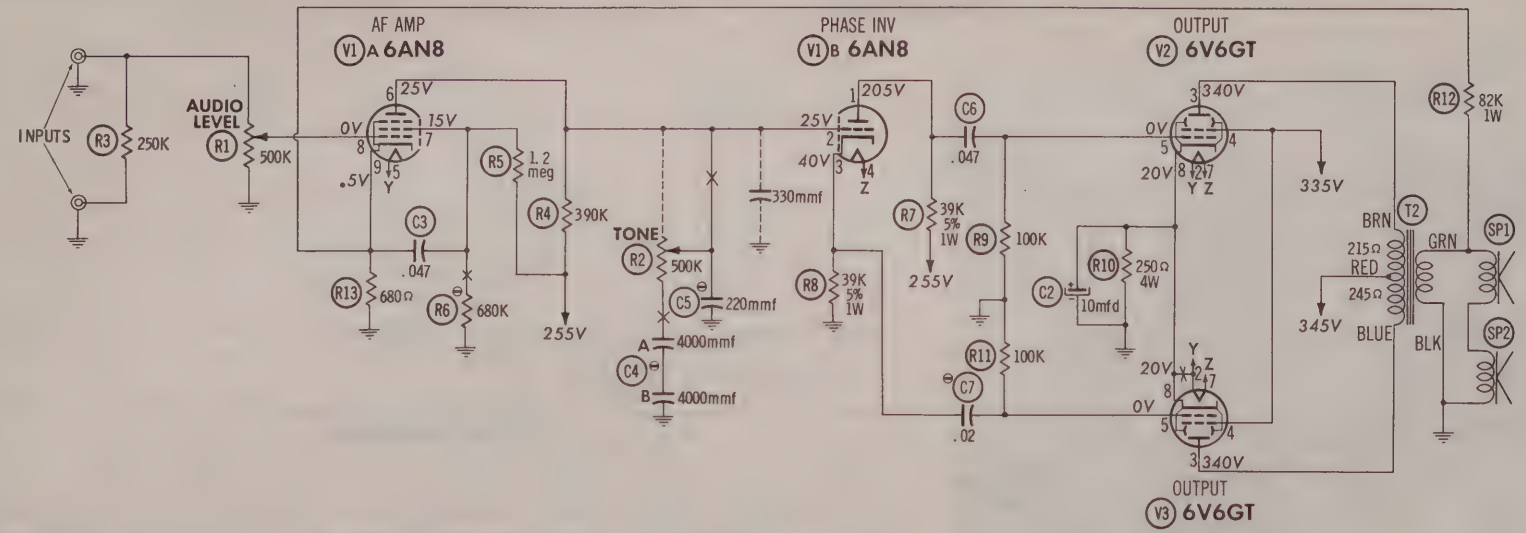
## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

## CHASSIS—BOTTOM VIEW

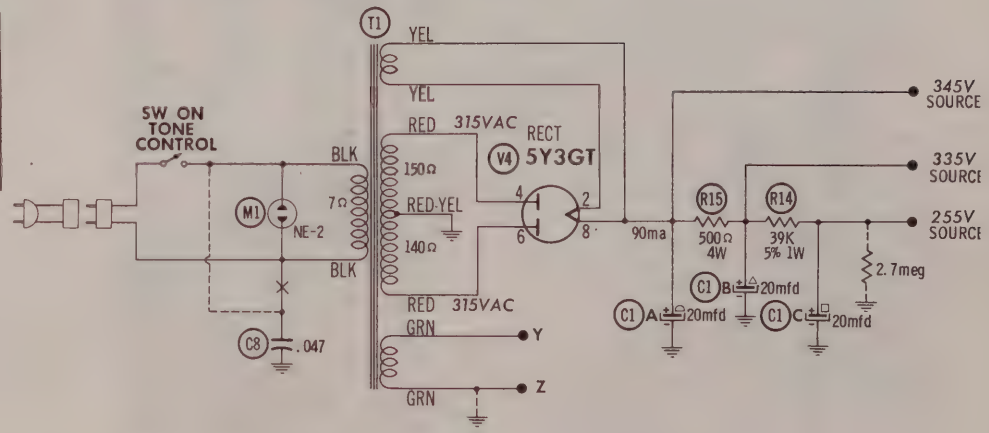





RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AN8 | †78K | †430K | 39K | 250Ω | 250Ω | †430K | †450K | 0Ω | 680Ω |
| V2 | 6V6GT | NC | 250Ω | †215Ω | †500Ω | 100K | NC | 250Ω | 250Ω | |
| V3 | 6V6GT | NC | 250Ω | †245Ω | †500Ω | 100K | NC | 250Ω | 250Ω | |
| V4 | 5Y3GT | NC | ¶ | NC | 150Ω | NC | 140Ω | NC | ¶ | |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V4.
NC NO CONNECTION




1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

**PENTRON MODELS CS-20, PS-10**

PHOTOFACT* Folder

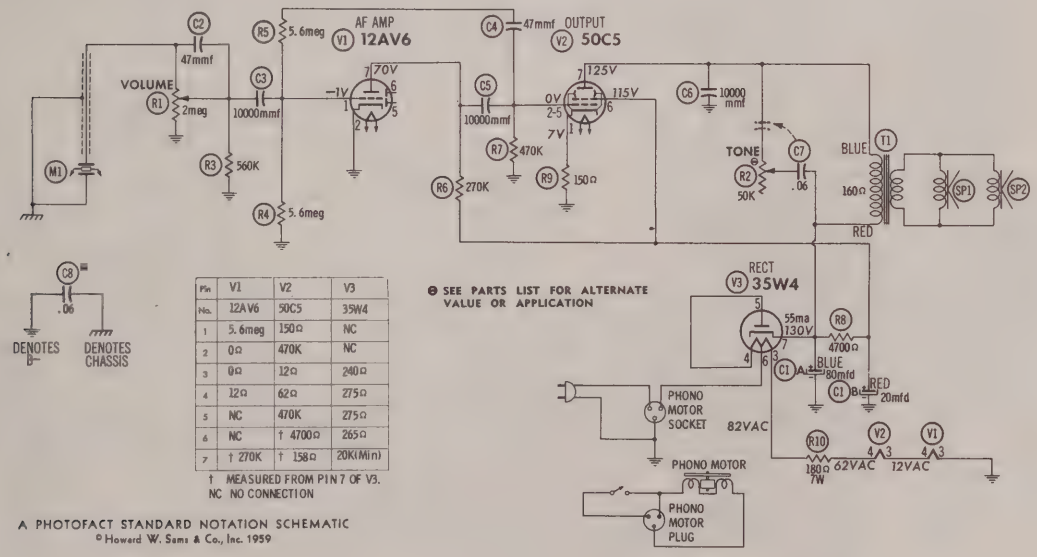
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# PHONOLA MODEL 858

PHONOLA MODEL 858

| | |
|---|---|
| TRADE NAME | Phonola Model 858 |
| MANUFACTURER | Waters Conley Co., Inc., Rochester, Minnesota |
| TYPE SET | AC Operated 3 Tube Phono Amplifier With 4 Speed Automatic Record Changer |
| POWER SUPPLY | 105 - 125 Volts AC, 60 Cycles RATING 27 Watts, .28 Amp. @117 Volts AC (Less Motor) |

FOR SERVICE INFORMATION ON RECORD CHANGER PART #13124 - SEE SIMILAR V-M959 - PHOTOFACT SET 396 FOLDER 13.




| Pin No. | V1 | V2 | V3 |
|---|---|---|---|
| 1 | 5.6meg | 150Ω | NC |
| 2 | 0Ω | 470K | NC |
| 3 | 0Ω | 12Ω | 240Ω |
| 4 | 12Ω | 62Ω | 275Ω |
| 5 | NC | 470K | 275Ω |
| 6 | NC | † 4700Ω | 265Ω |
| 7 | † 270K | † 158Ω | 20K(Min) |

† MEASURED FROM PIN 7 OF V3.
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H955

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



PHONOLA MODEL 858
SET 439 FOLDER 11

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF Amplifier | 12AV6 | |
| V2 | Output | 50C5 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V3 | Rectifier | 35W4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA PHONOLA PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 80 | 150 | 12018 | PRS150V8020 | BBRT44215 | TCT3116 | TDLT-4 | TVA-2460 | |
| B | 20 | 150 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA PHONOLA PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C2 | 47 | | | 11148 | DI-47 | DD-470 | L10Q47 | CNO-447 | 5GA-Q47 | |
| C3 | 10000 | | | 12019 | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C4 | 47 | | | 11148 | DI-47 | DD-470 | L10Q47 | CNO-447 | 5GA-Q47 | |
| C5 | 10000 | | | 12019 | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C6 | 10000 | | | 12019 | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | |
| C7 | .06 | 200 | | 11509 | P288N-06 | | | GEM-416 | 6TM-S6 | |
| C8 | .06 | 200 | | 11509 | P288N-06 | | | GEM-416 | 6TM-S6 | Note 1 |

Note 1. Some versions may use .1mfd in this application (Part #11977).

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA PHONOLA PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 2meg | ½ | 12400 | B-76 | A47-2meg-Z | Q13-139 | U55 | Volume |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| C | Bushing | | | AK-26 † | XB-2 † | S4 † | EB158 † | |
| R2A | 50K | ½ | 11507 ① | B-32 | A47-50K-Z | Q13-123 | U33 | Tone |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| C | Bushing | | | AK-26 † | XB-2 † | S4 † | EB158 † | |

① Part #12401 may be used in some versions.
† Saw off adaptor bushing to length required, and enlarge mounting hole in cabinet to accommodate 7/16 bushing.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

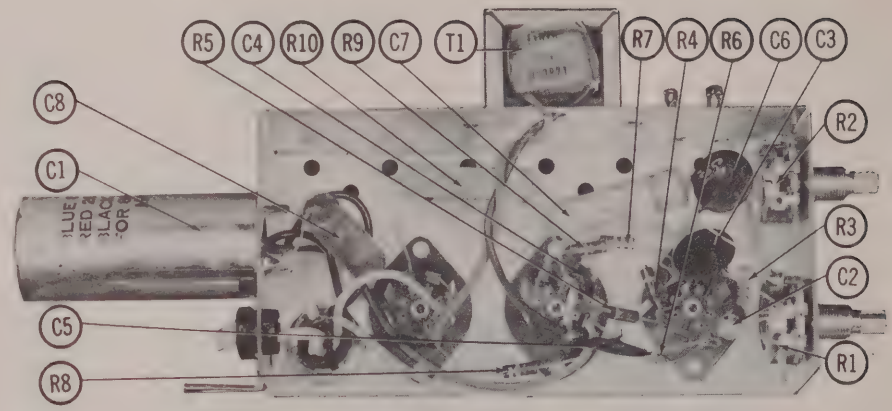
| ITEM No. | RATING OHMS | RATING WATT | PHONOLA PART No. | NOTES |
|---|---|---|---|---|
| R3 | 560K | | 8842 | |
| R4 | 5.6meg | | 10301 | |
| R5 | 5.6meg | | 10301 | |
| R6 | 270K | | 8841 | |

| ITEM No. | RATING OHMS | RATING WATT | PHONOLA PART No. | NOTES |
|---|---|---|---|---|
| R7 | 470K | | 10305 | |
| R8 | 4700Ω | | 10429 | |
| R9 | 150Ω | | 9897 | |
| R10 | 180Ω | 1 | 13063 | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA PHONOLA PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 2100Ω | 1-2Ω | 11876 | Z1001 | | | | 24S51 | | |

# CHASSIS-BOTTOM VIEW




## SPEAKER

| ITEM No. | TYPE SIZE | TYPE FIELD | TYPE V. C. IMP. | REPLACEMENT DATA PHONOLA PART No. | REPLACEMENT DATA QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 4" | PM | 3-4Ω | 11792 ① | 4A07 ① | ① Parallel And Phase |
| SP2 | 4" | PM | 3-4Ω | 11792 ① | 4A07 ① | |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA PHONOLA PART No. | ASTATIC PART No. CARTRIDGE | ASTATIC PART No. NEEDLE | JENSEN PART No. CARTRIDGE | JENSEN PART No. NEEDLE | REMARKS |
|---|---|---|---|---|---|---|
| M1 | 12827 ① | 81-T | | | | ① Includes needles |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 12126-8E | 2 Used |
| Case | 858 | |
| Handle | 13056-8B | |

## WIRING DATA

| | | |
|---|---|---|
| General-use Unshielded Hook-up Wire | Use BELDEN No. | 8530 (Solid) Available in Ten Colors<br>8524 (Stranded) Available in Ten Colors |
| Power Cord | Use BELDEN No. | 1765-B (6 Ft. Length)<br>1725-K (7½ Ft. Length) |
| Low-Loss Shielded Lead (Interconnecting) | Use BELDEN No. | 8401 |
| Phono Pick-up Arm Cable | Use BELDEN No. | 8430 (Two Conductor - Twisted) |

PHOTOFACT* Folder

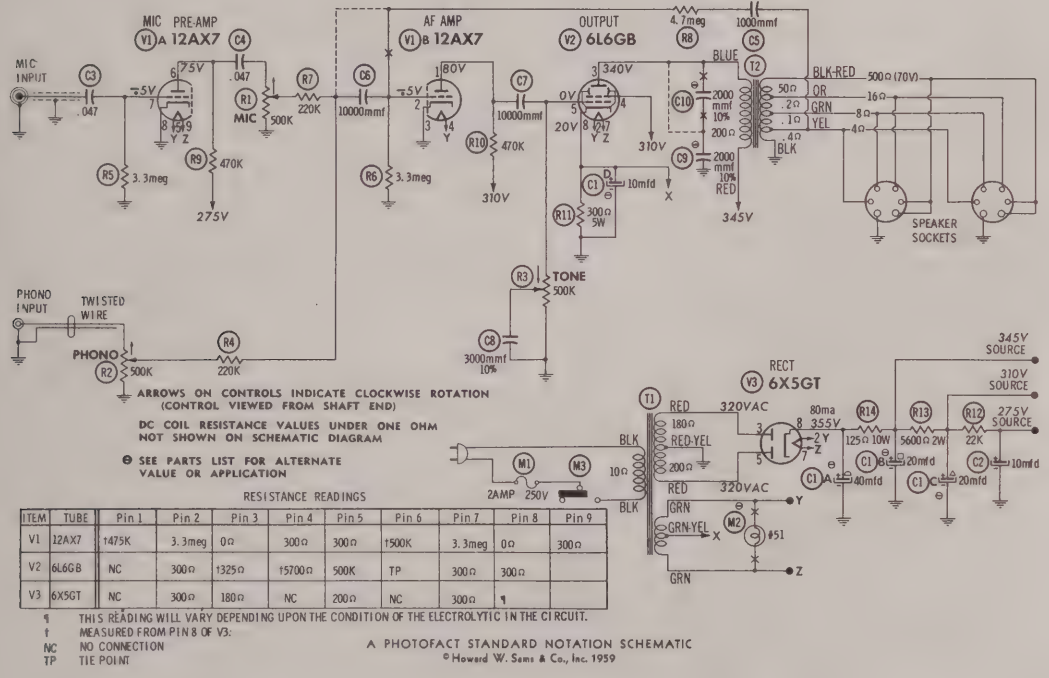
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# PRECISION MODEL 10PA

PRECISION
MODEL 10PA

| | |
|---|---|
| TRADE NAME | Precision Model 10PA |
| MANUFACTURER | Precision Electronics, Inc., 9109 King St., Franklin Park, Illinois |
| TYPE SET | AC Operated 3 Tube, 2 Channel Audio Amplifier |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles RATING 56 Watts, .49 Amp. @117 Volts AC |

PRECISION
MODEL 10PA




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 12AX7 | †475K | 3.3meg | 0Ω | 300Ω | 300Ω | †500K | 3.3meg | 0Ω | 300Ω |
| V2 | 6L6GB | NC | 300Ω | †325Ω | †5700Ω | 500K | TP | 300Ω | 300Ω | |
| V3 | 6X5GT | NC | 300Ω | 180Ω | NC | 200Ω | NC | 300Ω | ¶ | |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V3.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H969



SET 439 FOLDER 12

# PARTS LIST AND DESCRIPTIONS

## TUBES (GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1<br>V2 | Mic Preamp. -AF Amp.<br>Output | 12AX7<br>6L6GB | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V3 | Rectifier | 6X5GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA PRECISION PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲40 | 400 | | AFH4-18 | D0170 | FP444.6 | TMQ-18 | TVL-4771.6 | ① |
| B | ■20 | 400 | | | | | | | ① |
| C | ▲20 | 350 | | | | | | | |
| D | 10 | 350 | | | | | | | |
| C2 | 10 | 250 | | PRS350V10 | BR1045 | TC52 | TD-10-250 | TVA-1504 | |

① In some versions C1B is 30mfd and C1C is 10mfd.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA PRECISION PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C3 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C4 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C5 | 1000 | | | | BPD-001 | DD-102 | BYA10DIM | B-210 | 5GA-D1 | |
| C6 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5GA-S1 | |
| C7 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5GA-S1 | |
| C8 | 3000 | | 10% | | | | | JL-230 | 5HK-D3S 10%* | |
| C9 | 2000 | | 10% | | | | | JL-220 | 5HK-D2S 10%* | ① |
| C10 | 2000 | | 10% | | | | | JL-220 | 5HK-D2S 10%* | ① |

① When C9 is 1000mmf, C10 is not used.
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA PRECISION PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 500K | ½ | GVC-500K | B-60 | A47-500K-Z | Q13-133 | U48 | Mic |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |
| R2A | 500K | ½ | GVC-500K | B-60 | A47-500K-Z | Q13-133 | U48 | Phono. |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |
| R3A | 500K | ½ | GVC-500K | B-60 | A47-500K-Z | Q13-133 | U48 | Tone |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

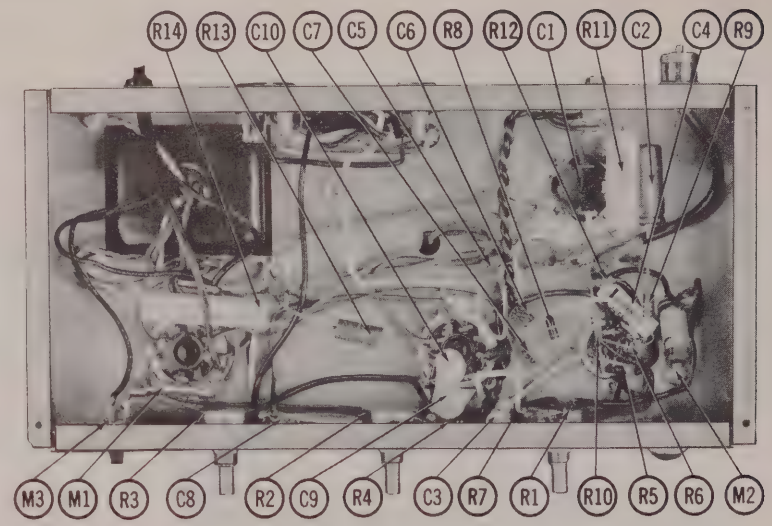
| ITEM No. | RATING OHMS | RATING WATT | PRECISION PART No. | NOTES |
|---|---|---|---|---|
| R4 | 220K | | | |
| R5 | 3.3meg | | | |
| R6 | 3.3meg | | | |
| R7 | 220K | | | |
| R8 | 4.7meg | | | |
| R9 | 470K | | | |

| ITEM No. | RATING OHMS | RATING WATT | PRECISION PART No. | NOTES |
|---|---|---|---|---|
| R10 | 470K | | | |
| R11 | 300Ω | 5 | | |
| R12 | 22K | | | |
| R13 | 5600Ω | 2 | | |
| R14 | 125Ω | 10 | | |

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | REPLACEMENT DATA PRECISION PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117V ⓐ .49A | 640 VCT ⓐ .080A | 6.3 VCT ⓐ 2A | TP-9 | P9305 | | | PM8408 | 22R04 | R-9B |

# CHASSIS-BOTTOM VIEW




## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA PRECISION PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T2 | 4200Ω | 500Ω (70V) Taps ⓐ 16Ω 8Ω 4Ω | T0-10G | | | | | | | |

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA PRECISION PART No. FUSE | PRECISION PART No. HOLDER | LITTELFUSE PART No. FUSE | LITTELFUSE PART No. HOLDER | BUSS PART No. FUSE | BUSS PART No. HOLDER |
|---|---|---|---|---|---|---|---|---|
| M1 | 3AG | 2A 250V | | | 312002, (2A 250V) | 101003 (2 Used) | AGC2 | 4051 (2 Used) |

## MISCELLANEOUS

| ITEM No. | PART NAME | PRECISION PART No. | NOTES |
|---|---|---|---|
| M2 | Lamp | | #51 (Not used in some versions). |
| M3 | Switch | | Power On-Off (SPST, Slide Type) |

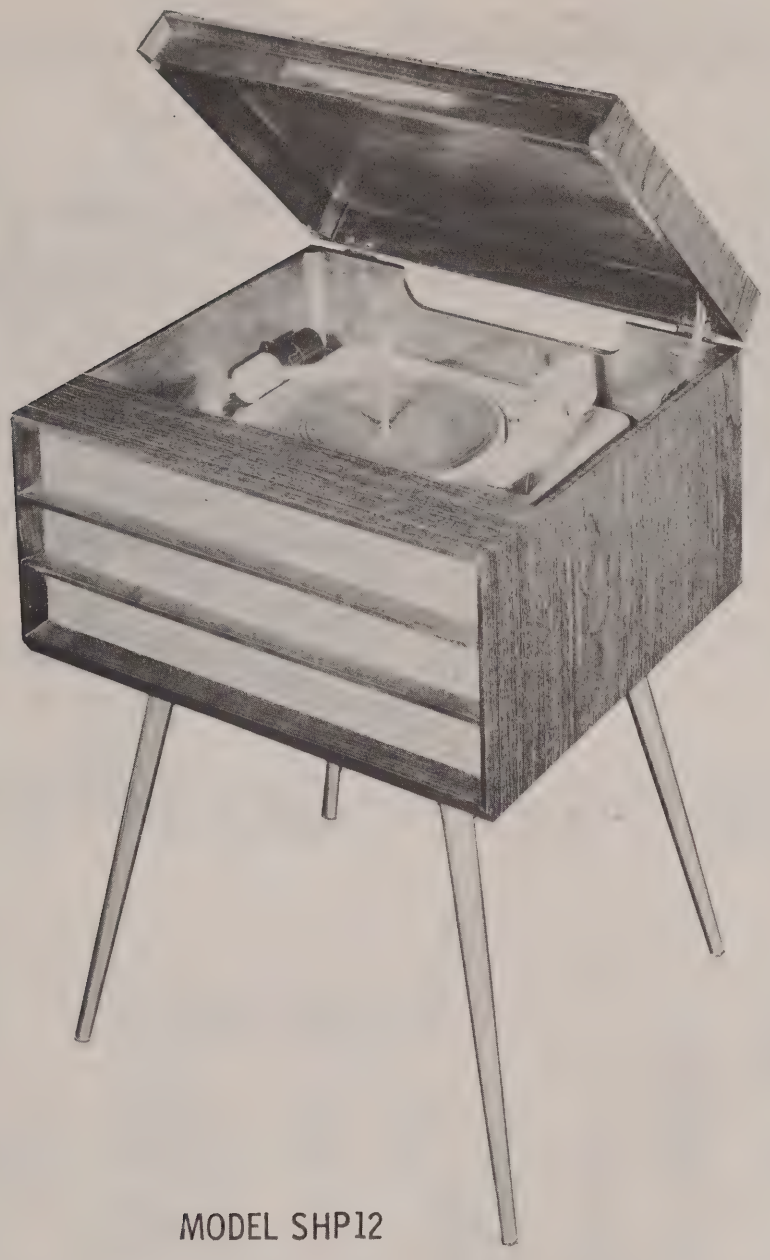
## WIRING DATA

| | |
|---|---|
| General-use Unshielded Hook-up Wire | Use BELDEN No. 8530 (Solid) Available in Ten Colors<br>8524 (Stranded) Available in Ten Colors |
| Power Cord | Use BELDEN No. 1765-B (6 Ft. Length)<br>1725-K (7½ Ft. Length) |
| Low-Loss Shielded Lead (Interconnecting) | Use BELDEN No. 8401 |
| Phono Pick-up Arm Cable | Use BELDEN No. 8430 (Two Conductor - Twisted) |

PHOTOFACT* Folder



RCA VICTOR MODELS AK1,
SHP12, SHP13 (Ch. RS-172)



MODEL SHP12

RCA VICTOR MODELS AK1,
SHP12, SHP13 (Ch. RS-172)

| | |
|---|---|
| TRADE NAME | RCA Victor Models AK-1, SHP-12, SHP-13 (Ch. RS-172) |
| MANUFACTURER | RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N. J. |
| TYPE SET | AC Operated Stereo Phono Amplifier With 4 Speed Automatic Record Changer |
| TUBES | Four |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycles RATING 32 Watts, .365 Amp. @ 117 Volts AC (Less Motor) |

FOR SERVICE INFORMATION ON RECORD CHANGER RP-205H-1 - SEE RCA RP-205 SERIES - PHOTOFACT SET 358 FOLDER 10 OR RECORD CHANGER MANUAL RC-10

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Left Channel AF Amp. | 12AU6 | |
| V2 | Left Channel Output | 35C5 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V3 | Right Channel AF Amp. | 12AU6 | |
| V4 | Right Channel Output | 35C5 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | RCA Victor PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
| C1A | 80 | 150 | 106333 | PR4-50 | BBRT5515C | | | TVL-4435 | |
| B | 50 | 150 | | | BR8015 | | | | |
| C | 50 | 150 | | | | | | | |
| D | 25 | 25 | | | | | | | |
| C2 | 50 | 6 | ① | SRE6V50 | BBR50-6 | TT6X50 | TD-50-6 | TVA-1100 | |
| C3 | 8 | 10VAC | 100509 ② | AC-PRS10V8 | BBR16-90 † | TC108 | TD-16-150 † | TVAS-1112 * | |
| | | | | | BBR16-90 † | | TD-16-150 † | | |

① Some versions may use 1mfd @ 50V in this application (Part #106772).
② Model SHP-13 uses 2mfd @ 10VAC in this application (Part #106556).
† Connect negative leads together.
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

## FIXED CAPACITORS

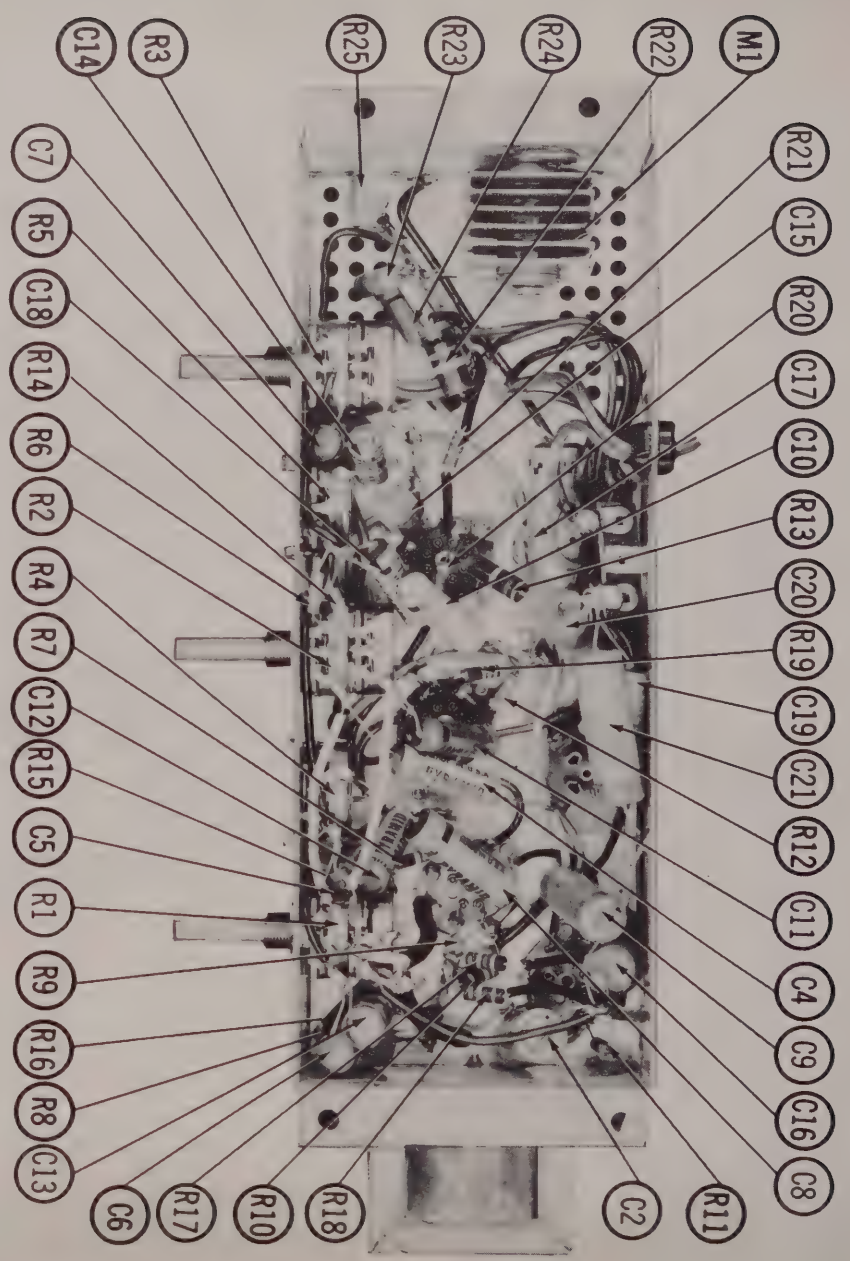
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | RCA Victor PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C4 | .01 | 200 | 10% | 79316 | | | | GEM-1611 | 2WF-S10 | |
| C5 | .0018 | 600 | 10% | 77468 | | | | | | |
| C6 | .033 | 200 | 10% | 79015 | | | | | 2WF-S33 | |
| C7 | .0022 | 600 | 10% | 73595 | | | | | 6TM-D22 | |
| C8 | .022 | 400 | | 73562 | P488N-022 | DF-203 | CUB4S22 | GEM-4122 | 4TM-S22 | |
| C9 | .047 | 400 | | 73553 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C10 | .0068 | 400 | 10% | 73789 | | | | GEM-16268 | 5BF-D68 | |
| C11 | .01 | 200 | 10% | 79316 | | | | GEM-1611 | 2WF-S10 | |
| C12 | .0018 | 600 | 10% | 77468 | | | | | | |
| C13 | .033 | 200 | 10% | 79015 | | | | | 2WF-S33 | |
| C14 | .0022 | 600 | 10% | 73595 | | | | | 6TM-D22 | |
| C15 | .022 | 400 | | 73562 | P488N-022 | DF-203 | CUB4S22 | GEM-4122 | 4TM-S22 | |
| C16 | .047 | 400 | | 73553 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C17 | .1 | 400 | | 73551 | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C18 | .0068 | 400 | 10% | 73789 | | | | GEM-16268 | 5BF-D68 | |
| C19 | .0047 | 400 | | 73920 | P488N-0047 | D6-472 | CUB6D47 | GEM-6247 | 6TM-D47 | |
| C20 | .047 | 400 | | 73553 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C21 | .047 | 400 | | 73553 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | RCA Victor PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 1.5meg | ½ | 106330 | | | | | Loudness, Tap @ 250K & 500K, Left Channel |
| B | 1.5meg | ½ | | | | | | Loudness, Tap @ 250K & 500K, Right Channel |
| R2A | 2meg | ½ | 106332 | | | Q11-139 | | Bass, Left Channel |
| B | 2meg | ½ | | | | M11-139 | | Bass, Right Channel |
| R3A | 2meg | ½ | 106331 | | | Q11-139 | | Treble, Left Channel |
| B | 2meg | ½ | | | | M11-139 | | Treble, Right Channel |
| R4A | 500K | ½ | 105210 | AB-59 | B47-500K-S | B11-133 | TA55L | Equalization, Left Channel |
| B | Shaft | | | AK-1 | Not Req. | TM1 | Not Req. | |
| R5A | 500K | ½ | 105210 | AB-59 | B47-500K-S | BN-133 | TA55L | Equalization, Right Channel |
| B | Shaft | | | AK-1 | Not Req. | TM1 | Not Req. | |

## CHASSIS-BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | RCA Victor PART No. | NOTES |
|---|---|---|---|---|
| R6 | 180K | | 502418 | |
| R7 | 100K | | 502410 | |
| R8 | 12K | | 502312 | |
| R9 | 470K | | 502447 | |
| R10 | 820K | | 502482 | |
| R11 | 3300Ω | | 502233 | |
| R12 | 4700Ω | | 502247 | |
| R13 | 82Ω | 1 | 512082 | |
| R14 | 180K | | 502418 | |
| R15 | 100K | | 502410 | |
| R16 | 12K | | 502312 | |
| R17 | 470K | | 502447 | |
| R18 | 820K | | 502482 | |
| R19 | 33K | | 502333 | |
| R20 | 4700Ω | | 502247 | |
| R21 | 680Ω | | 502168 | |
| R22 | 100Ω | 2 | 522110 | |
| R23 | 15Ω | 1 | 512015 | |
| R24 | 15Ω | 1 | 512015 | |
| R25 | 150Ω | 4 | 106498 | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA RCA Victor PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 2900Ω | 6-8Ω Tap @ 3-4Ω | 106504 | Z1006 | A-2902 | AU-604 | A-3849 | 24S64 | | |
| T2 | 2900Ω | 6-8Ω Tap @ 3-4Ω | 106504 | Z1006 | A-2902 | AU-604 | A-3849 | 24S64 | | |

## SPEAKER

| ITEM No. | TYPE SIZE | TYPE FIELD | TYPE V. C. IMP. | REPLACEMENT DATA RCA Victor PART No. | REPLACEMENT DATA QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 6½" | PM | 3-4Ω | 100464 | 6A21 | ① Parallel and Phase |
| SP2 | 3½" | PM | 6-8Ω | 105395 | 3A15TZ6.4 ① | |
| SP3 | 3½" | PM | 6-8Ω | 105395 | 3A15TZ6.4 ① | |

## SELENIUM RECTIFIER

| ITEM No. | RATING CURRENT (Measured) | REPLACEMENT DATA RCA Victor PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | NOTES |
|---|---|---|---|---|---|---|
| M1 | .0875A | 100654 | 1235AH | T100 SD-94 ① | 150 K200 ① | ① Silicon Type |

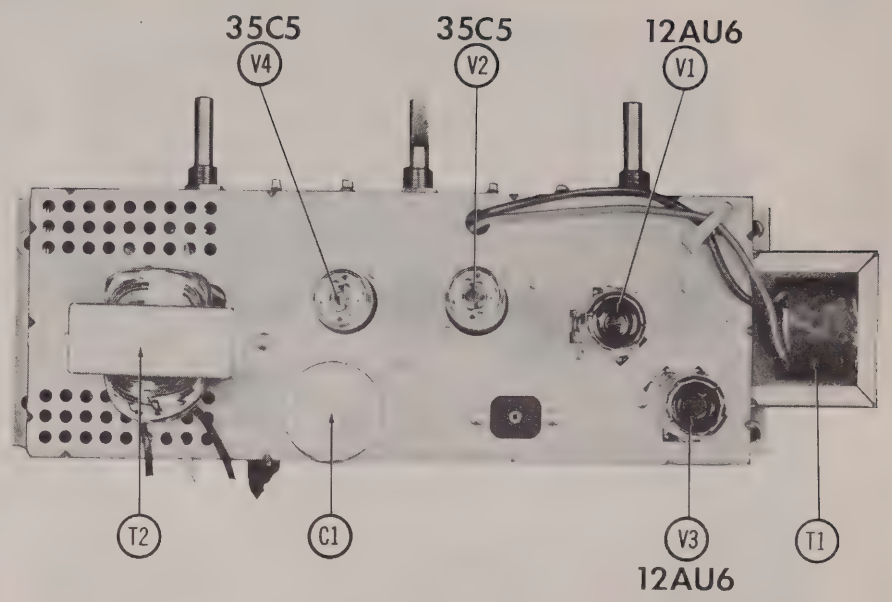
## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA RCA Victor PART No. | ASTATIC PART No. CARTRIDGE | ASTATIC PART No. NEEDLE | JENSEN PART No. CARTRIDGE | JENSEN PART No. NEEDLE | REMARKS |
|---|---|---|---|---|---|---|
| M2 | 106771 | 73-TB * | | | | * Includes mounting mechanism |

## MISCELLANEOUS

| ITEM No. | PART NAME | RCA Victor PART No. | NOTES |
|---|---|---|---|
| M3 | Switch | 46760 | Speaker Selector, Internal-External (DPDT, Slide Type) |

## CHASSIS-TOP VIEW



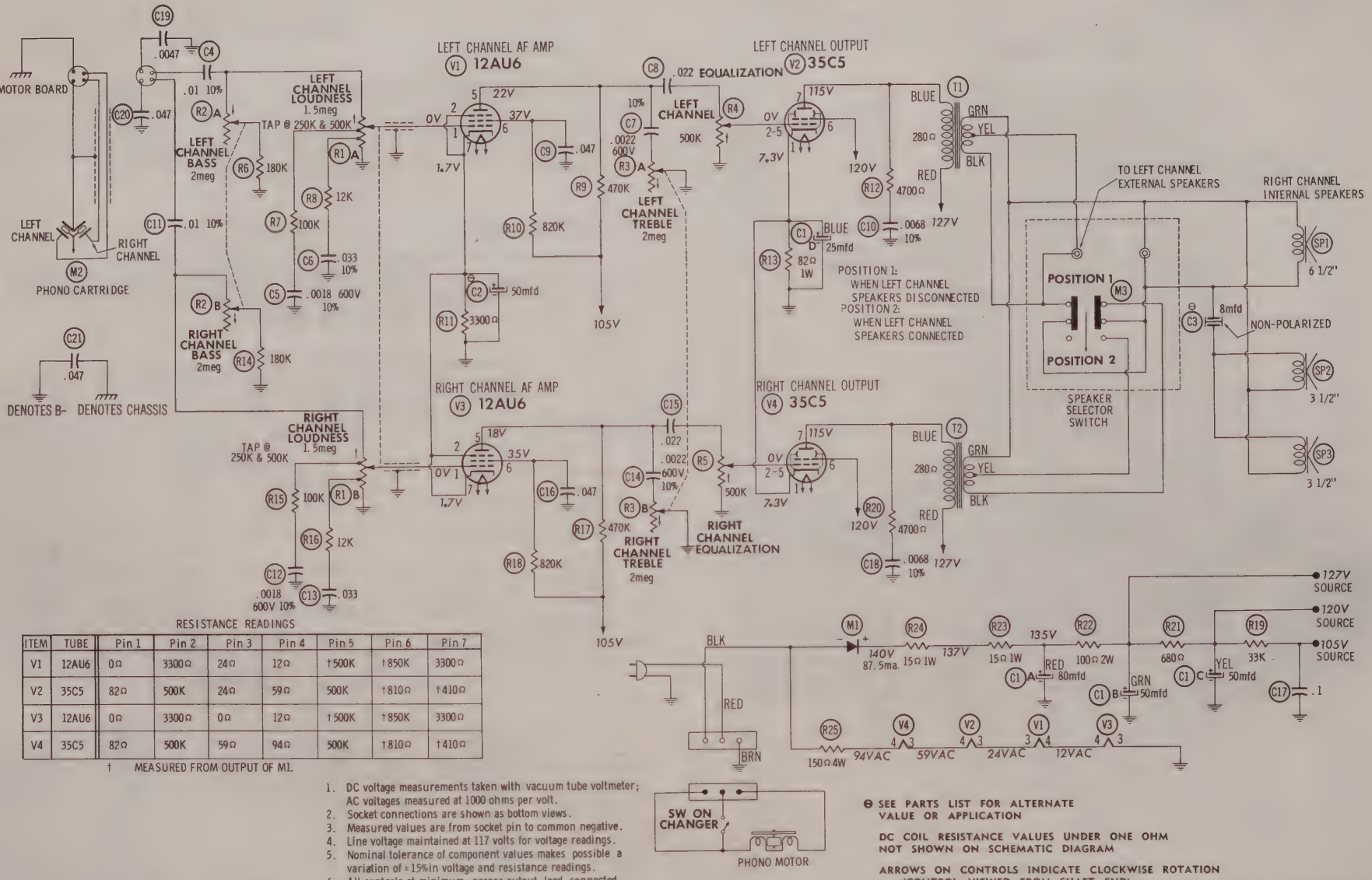

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 104122 | Volume |
| Knob | 104123 | Bass, Treble |
| Cabinet | X4361 | Mahogany, Includes Speaker Baffle, Less Legs, Model SHP-12 |
| Cabinet | X4364 | Maple, Includes Speaker Baffle, Less Legs, Model SHP-12 |
| Cabinet | X4362 | Oak, Includes Speaker Baffle, Less Legs, Model SHP-12 |
| Cabinet | X4363 | Walnut, Includes Speaker Baffle, Less Legs, Model SHP-12 |
| Cabinet | X4424 | Brown/Beige, Model SHP-13 |
| Leg | Z3792 | Four used, Model SHP-12 |
| Foot | 76891 | Three used, Model SHP-13 |
| Handle | 106557 | Includes Supports, Model SHP-13 |

## WIRING DATA

| | |
|---|---|
| General-use Unshielded Hook-up Wire | Use BELDEN No. 8530 (Solid) Available in Ten Colors<br>8524 (Stranded) Available in Ten Colors |
| Power Cord | Use BELDEN No. 1765-B (6 Ft. Length)<br>1725-K (7½ Ft. Length) |
| Low-Loss Shielded Lead (Interconnecting) | Use BELDEN No. 8401 |
| Phono Pick-up Arm Cable | Use BELDEN No. 8430 (Two Conductor - Twisted) |




RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 12AU6 | 0Ω | 3300Ω | 24Ω | 12Ω | †500K | †850K | 3300Ω |
| V2 | 35C5 | 82Ω | 500K | 24Ω | 59Ω | 500K | †810Ω | †410Ω |
| V3 | 12AU6 | 0Ω | 3300Ω | 0Ω | 12Ω | †500K | †850K | 3300Ω |
| V4 | 35C5 | 82Ω | 500K | 59Ω | 94Ω | 500K | †810Ω | †410Ω |

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1959

**RCA VICTOR MODELS AK1, SHP12, SHP13 (Ch. RS-172)**

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# SILVERTONE MODEL 9222 (Ch. 528.53400)

SILVERTONE MODEL 9222 (Ch. 528.53400)

| | |
|---|---|
| TRADE NAME | Silvertone Model 9222 (CH. 528.53400) |
| SUPPLIER | Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois |
| TYPE SET | Battery Operated Portable Transistorized AM Receiver |
| POWER SUPPLY | 9 Volts DC |
| TUNING RANGE—BROADCAST | 535 - 1620KC |
| RATING | 7MA @ 9 Volts DC (No Signal, Min Volume)<br>12MA @ 9 Volts DC (Signal, Normal Volume) |

## ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1, A2, A3, A4.... GENERAL CEMENT #5097, 8728
WALSCO #2515

A6..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

A5, A7..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1mfd. | High side to base of converter (X1). Common to B-. | 455KC (400~ Mod.) | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. |
| 2. | | Loop | 1630KC | " | " | A5 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 600KC | 600KC | " | A6 | Adjust for maximum output while rocking tuning gang. Repeat steps 2 & 3. |
| 4. | | " | 1400KC | Tune for 1400KC signal | " | A7 | Adjust for maximum output |

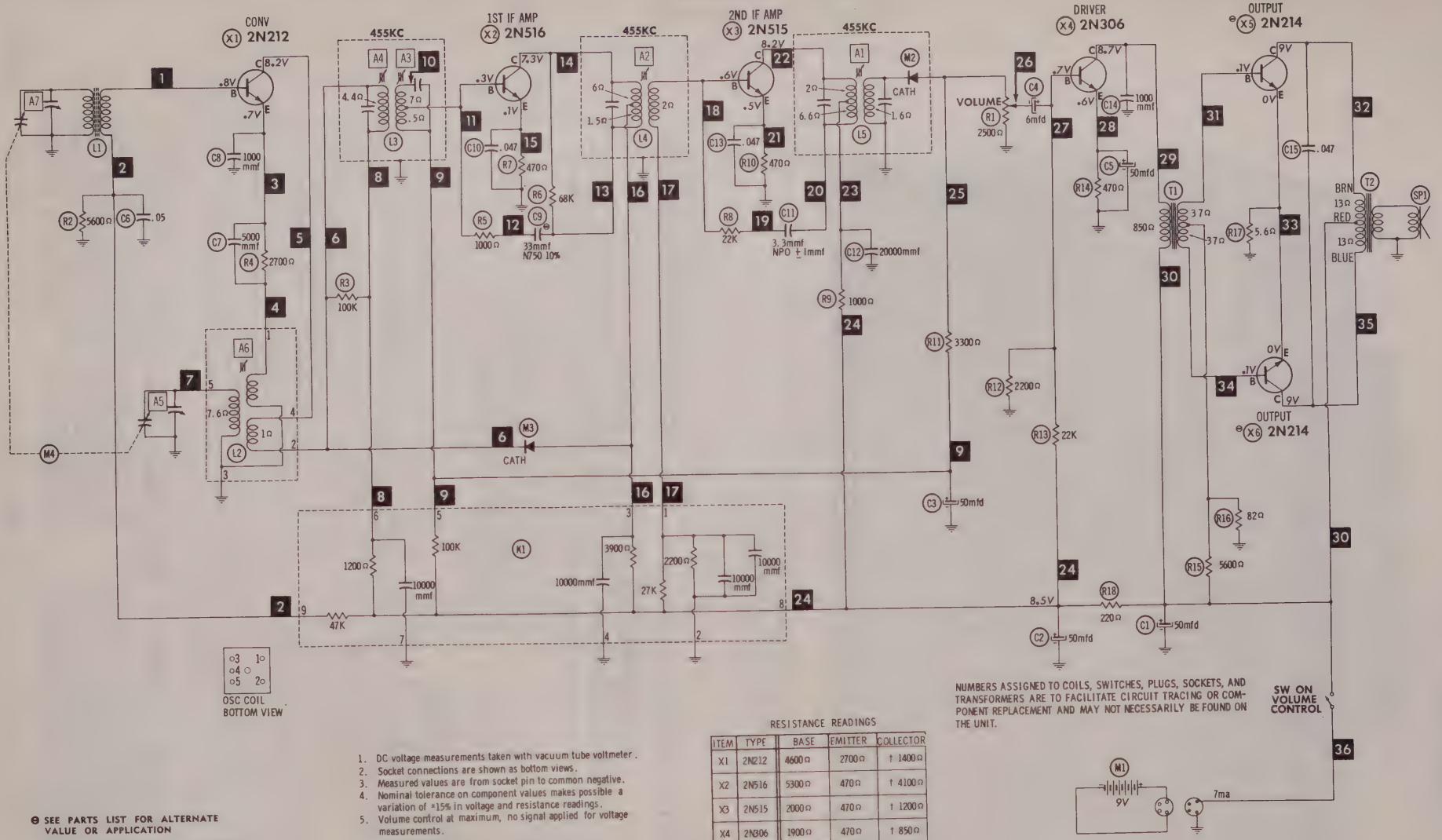
**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H897



SET 439 FOLDER 14




NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

| ITEM | TYPE | BASE | EMITTER | COLLECTOR |
|---|---|---|---|---|
| X1 | 2N212 | 4600Ω | 2700Ω | ↑ 1400Ω |
| X2 | 2N516 | 5300Ω | 470Ω | ↑ 4100Ω |
| X3 | 2N515 | 2000Ω | 470Ω | ↑ 1200Ω |
| X4 | 2N306 | 1900Ω | 470Ω | ↑ 850Ω |
| X5 | 2N214 | 95Ω | 5.6Ω | ↑ 13Ω |
| X6 | 2N214 | 95Ω | 5.6Ω | ↑ 13Ω |

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
↑ MEASURED FROM JUNCTION OF R15 AND R18.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

© Howard W. Sams & Co., Inc. 1959

**SILVERTONE MODEL 9222 (Ch. 528.53400)**

# PARTS LIST AND DESCRIPTIONS

## TRANSISTORS

| ITEM No. | ORIG. TYPE | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | | CBS PART No. | RCA PART No. | RAYTHEON PART No. | SYLVANIA PART No. | |
| X1 | 2N212 | Converter | | | | 2N212 | NPN |
| X2 | 2N516 | 1st IF Amplifier | | | | 2N516 | NPN |
| X3 | 2N515 | 2nd IF Amplifier | | | | 2N515 | NPN |
| X4 | 2N306 | Driver | LT-5010 | | | 2N306 | NPN |
| X5 | 2N214 * | Output | | | | 2N214 | NPN |
| X6 | 2N214 * | Output | | | | 2N214 | NPN |

* Some versions may use SYL1253 in this application.

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | Silvertone PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1 | 50 | 15 | 18-61-5 | XPP-15050 | NL50-10 | TT15X50 | ML50-15 | VL-1174 | |
| C2 | 50 | 15 | 18-61-5 | XPP-15050 | NL50-10 | TT15X50 | ML50-15 | VL-1174 | |
| C3 | 50 | 15 | 18-61-5 | XPP-15050 | NL50-10 | TT15X50 | ML50-15 | VL-1174 | |
| C4 | 6 | 15 | 18-60-5 | XPP-15006 | NL6-25 | TT25X5 | ML6-15 | VL-1165 | |
| C5 | 50 | 15 | 18-61-5 | XPP-15050 | NL50-10 | TT15X50 | ML50-15 | VL-1174 | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | Silvertone PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C6 | .05 | 12 | | 20-57-1 | P288N-05 | DF-503 | CUB2S5 | GEM-415 | 2TM-S5 | |
| C7 | 5000 | | | 15-50216 | BPD-005 | DD-502 | BYA10D5 | DC525 | 5HK-D5 | |
| C8 | 1000 | | | 15-10216 | BPD-001 | DD-102 | BYA6D1 | DC521 | 5HK-D1 | |
| C9 | 33 | | N750 10% | | N750-DI 33 | DTN-33 | C10Q33U | | 5TCU-Q33 | ① |
| C10 | .047 | 200 | | 20-56-1 | P288N-047 | DF-503 | BC2S47J | ACE6147 | 2SE-S47 | |
| C11 | 3.3 | | NPO ±1mmf | 15-339141 | | | | | | |
| C12 | 20000 | | | 15-20317 | BPD-02 | DD-203 | BYB6S2 | | 5HK-S2 | |
| C13 | .047 | 200 | | 20-56-1 | P288N-047 | DF-503 | BC2S47J | ACE6147 | 2SE-S47 | |
| C14 | 1000 | | | 15-10216 | BPD-001 | DD-102 | BYA6D1 | DC521 | 5HK-D1 | |
| C15 | .047 | 200 | | 20-56-1 | P288N-047 | DF-503 | BC2S47J | ACE6147 | 2SE-S47 | |

① Some versions may use 39mmf in this application (Part #15-390114).

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | Silvertone PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1 | 2500Ω | ½ | 24-331-0 | | | | | Volume & Switch |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | Silvertone PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R2 | 5600Ω | | 60-56201 | |
| R3 | 100K | | 60-10401 | |
| R4 | 2700Ω | | 60-27201 | |
| R5 | 1000Ω | | 60-10201 | |
| R6 | 68K | | 60-68301 | |
| R7 | 470Ω | | 60-47101 | |
| R8 | 22K | | 60-22301 | |
| R9 | 1000Ω | | 60-10201 | |
| R10 | 470Ω | | 60-47101 | |

| ITEM No. | RATING | | Silvertone PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R11 | 3300Ω | | 60-33201 | |
| R12 | 2200Ω | | 60-22201 | |
| R13 | 22K | | 60-22301 | |
| R14 | 470Ω | | 60-47101 | |
| R15 | 5600Ω | | 60-56201 | |
| R16 | 82Ω | | 60-82001 | |
| R17 | 5.6Ω | | 60-56901 | |
| R18 | 220Ω | | 60-22101 | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | Silvertone PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | |
| L1 | Loopstick | 82-147-0 | | | | | |
| L2 | Osc. Coil | 10-48-4 | | | | | |
| L3 | 1st IF Trans. | 10-78-2 | | | | | |
| L4 | 2nd IF Trans. | 10-79-2 | | | | | |
| L5 | 3rd IF Trans. | 10-80-2 | | | | | |

# PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo

# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (DRIVER)

| ITEM No. | TURNS RATIO | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | Silvertone PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2.5 | : 1 | 80-23-1 | | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | Silvertone PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 500Ω CT | 3-4Ω | 80-70-1 | | | | | | | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | Silvertone PART No. | QUAM PART No. | |
| SP1 | 4" | PM | 3-4Ω | 33-377-4 ① | 4A05 | ① Includes T1 |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | Silvertone PART No. | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Converter-IF Circuitry | 10000mmf, 10000mmf, 10000mmf, 10000mmf, 47K, 1200Ω, 100K, 3900Ω, 27K, 2200Ω | 13-14-5 | |

## BATTERIES

| ITEM No. | VOLTAGE | Silvertone PART No. | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | BURGESS | | EVEREADY | | MALLORY | | |
| | | | "A" | "B" | "A" | "B" | "A" | "B" | |
| M1 | 9V | 57-6420 | | D6P1 | | 2506 | | M1601 | |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | Silvertone PART No. | CBS PART No. | SYLVANIA PART No. | |
| M2 | CTP461 * | 83-1192 | 1N60 | 1N295 | Detector (Pigtail) |
| M3 | CTP461 * | 83-1192 | 1N60 | 1N295 | Overload (Pigtail) |

* Some versions may use 1N60 in this application.

## MISCELLANEOUS

| ITEM No. | PART NAME | Silvertone PART No. | NOTES |
|---|---|---|---|
| M4 | Tuning Cap.<br>Printed Board | 19-76-2<br>D25-10-1F | 2 Gang (Includes Trimmer A7, Part #19-187-0). |

## CABINETS & CABINET PARTS

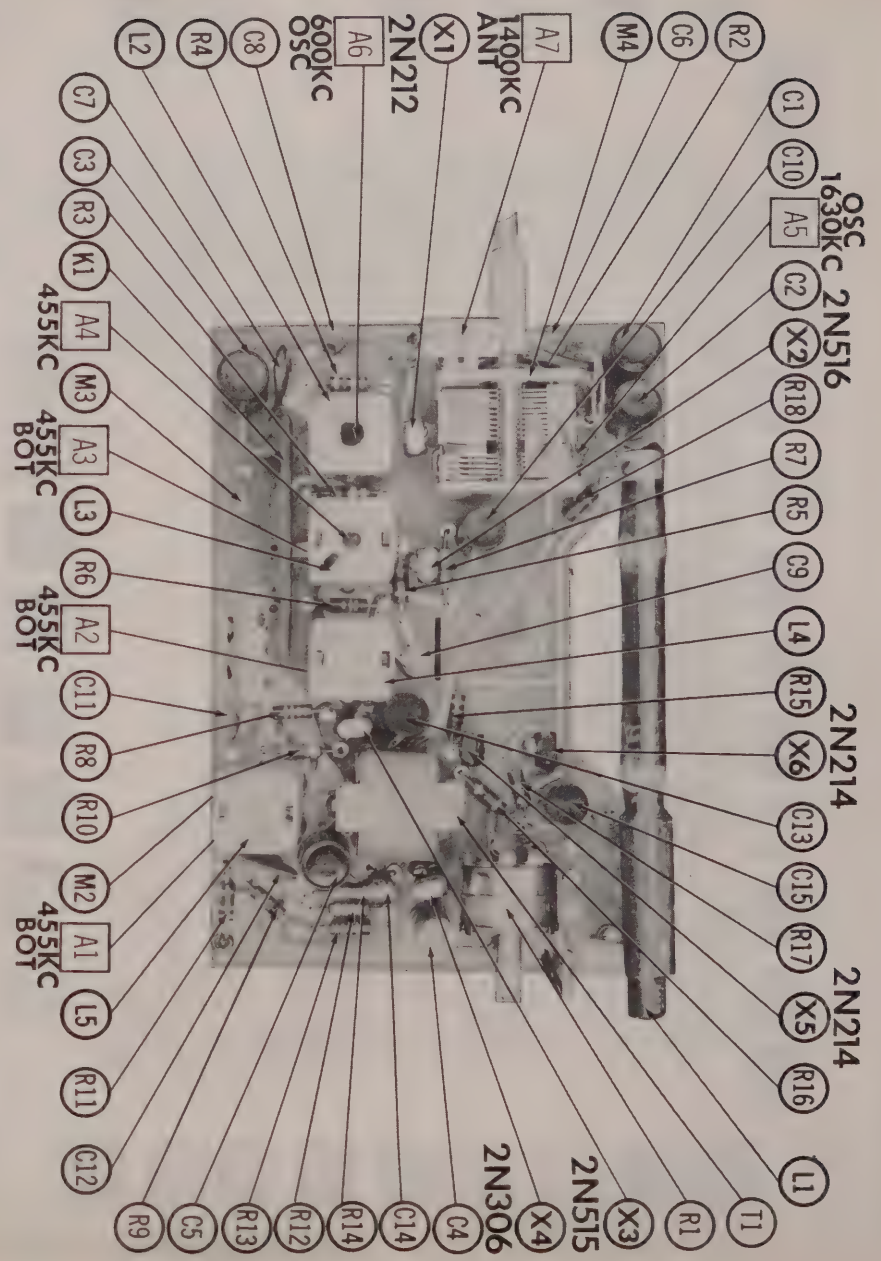
**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 52-1117-0 | Tuning |
| Knob | 52-1118-0 | Volume-On-Off |
| Cabinet | 4264-1 | |

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

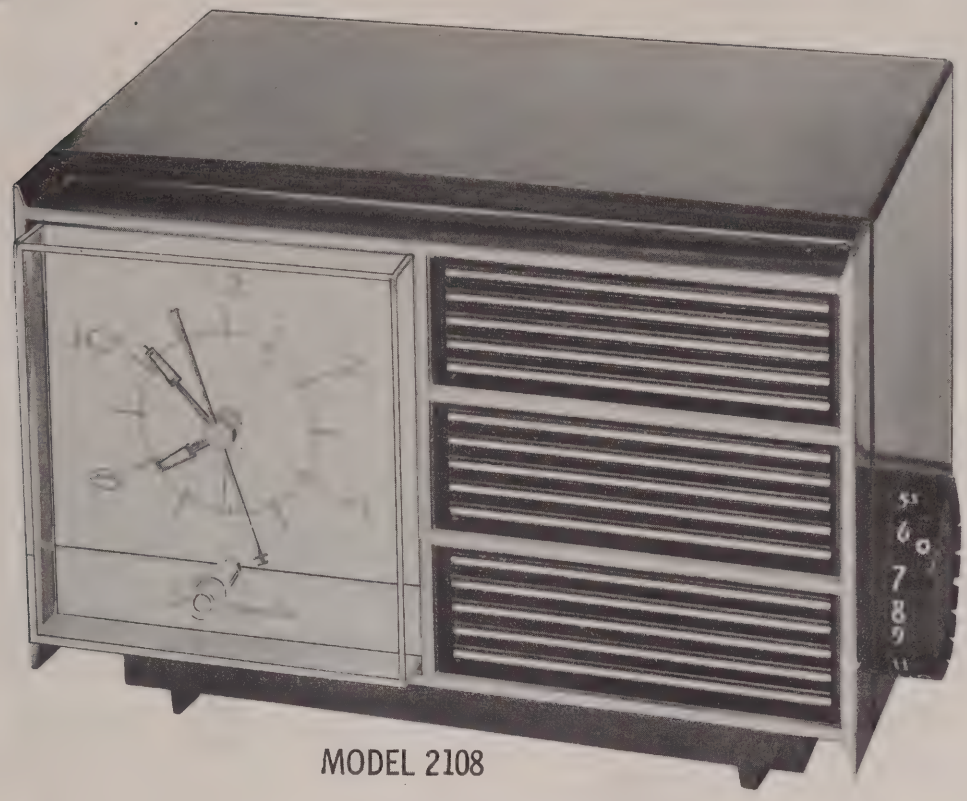
## CHASSIS—TOP VIEW



PHOTOFACT* Folder with CIRCUITRACE*



SYLVANIA MODELS 1107, 2108
(Ch. 1-629-1, -2)



MODEL 2108

| | |
|---|---|
| TRADE NAME | Sylvania Models 1107, 2108 (CH. 1-629-1, -2) |
| MANUFACTURER | Sylvania Home Electronics, Div. of Sylvania Electric Products Inc., 700 Ellicott St., Batavia, N. Y. |
| TYPE SET | AC Operated AM Receiver With Electric Clock, Model 2108 Only |
| TUBES | Four |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles |
| RATING | 29 Watts, .30 Amp. @117 Volts AC (Less Clock) |
| TUNING RANGE—BROADCAST | 540 - 1650KC |

# ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A1, A2.....GENERAL CEMENT #5097, 8727
WALSCO #2515
A3, A4.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2515

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1mfd | High side to pin 1 (grid) of 12AU6 (V1). Low side to B-. | 455KC (400~ Mod.) | Tuning gang fully open. | Across voice coil. | A1, A2 | Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200mmf to reduce hum modulation. |
| 2. | | Loop | 1650KC | " | " | A3 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 600KC | Tune to 600KC signal. | | A4 | " |

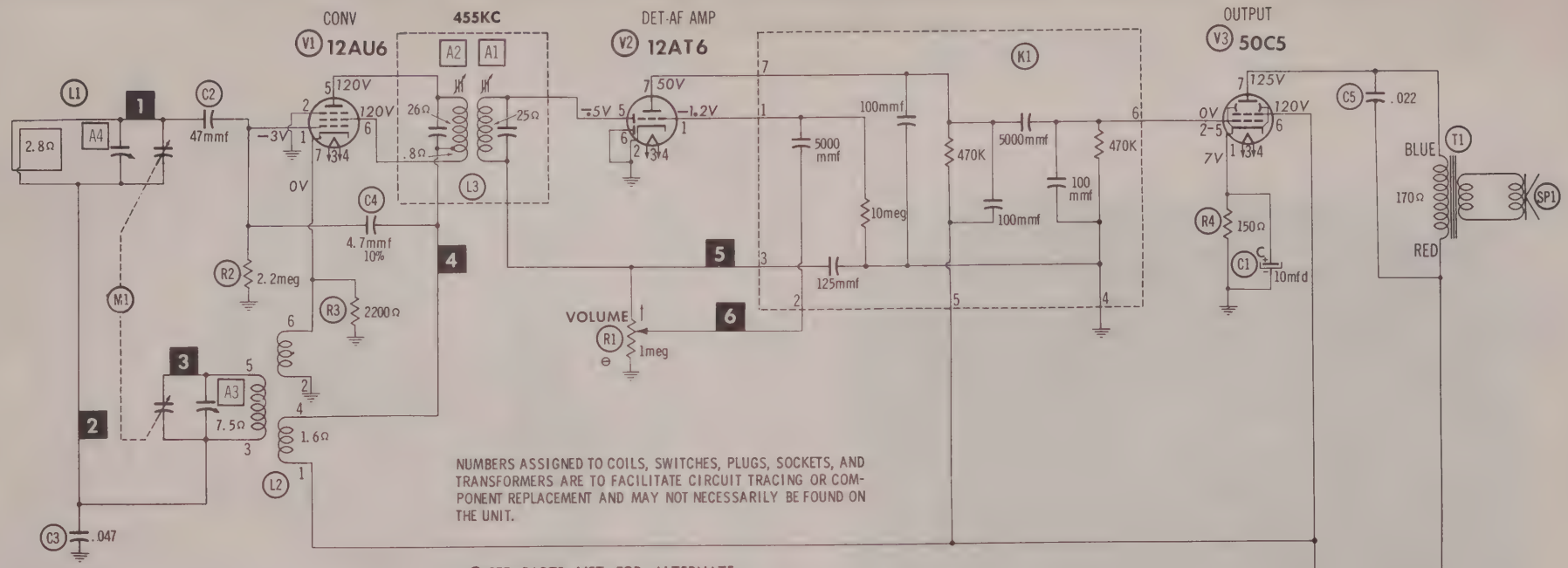
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H971



SET 439 FOLDER 15




NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

OSC COIL
BOTTOM VIEW

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

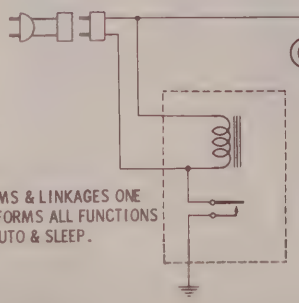
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS

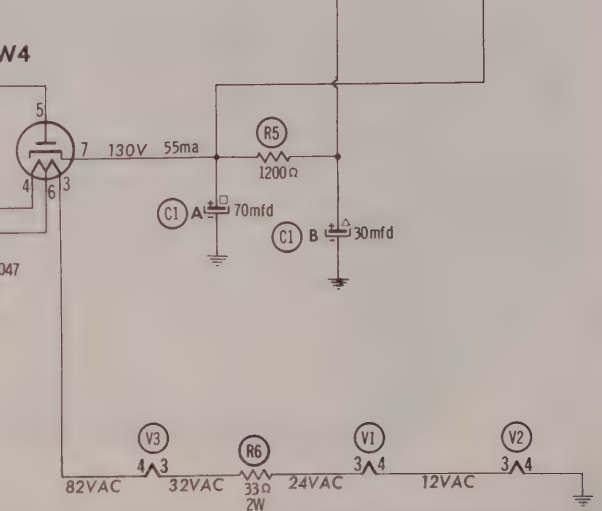
| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 12AU6 | 2.2meg | 0Ω | 24Ω | 12Ω | †1200Ω | †1200Ω | .8Ω |
| V2 | 12AT6 | 10meg | 0Ω | 12Ω | 0Ω | 1meg | 0Ω | †470K |
| V3 | 50C5 | 150Ω | 470K | 57Ω | 100Ω | 470K | †1200Ω | †170Ω |
| V4 | 35W4 | NC | TP | 100Ω | 135Ω | 135Ω | 125Ω | ¶ |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V4.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



THROUGH CAMS & LINKAGES ONE SWITCH PERFORMS ALL FUNCTIONS OF ON-OFF-AUTO & SLEEP.




A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

©Howard W. Sams & Co., Inc. 1959

**SYLVANIA MODELS 1107, 2108**
**(Ch. 1-629-1, -2)**

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Converter | 12AU6 | |
| V2 | Det. -AF Amp. | 12AT6 | |
| V3 | Output | 50C5 | |
| V4 | Rectifier | 35W4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | SYLVANIA PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
| C1A | ■70 | 150 | 161-3035 | AFH3-81-50 | BBRT84215 | PFP311.12 | | PCL-3432 | |
| B | ▲30 | 150 | | | | | | | |
| C | 10 | 25 | | | | | | | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | SYLVANIA PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | 47 | 400 | | | SI 47 | D6-470 | LT6Q47 | CNO-447 | 5TCCB-Q47 | |
| C3 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C4 | 4.7 | | 10% | | NPO-SI 4.7 | TCZ-4R7 | CTA6V47C | CNO-547 | 5TCCB-V47 | |
| C5 | .022 | 400 | | | P488N-022 | DD-203 | CUB4S22 | GEM-4122 | 4TM-S22 | |
| C6 | .047 | 400 | | | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | SYLVANIA PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1 | 1meg | ½ | 157-0051 ① | | | | | Volume |

① Part #157-0050 (with switch) used in Model 1107.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | SYLVANIA PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R2 | 2.2meg | | | |
| R3 | 2200Ω | | | |
| R4 | 150Ω | | | |

| ITEM No. | RATING | | SYLVANIA PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R5 | 1200Ω | | | |
| R6 | 33Ω | 2 | | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|
| | | SYLVANIA PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | NOTES |
| L1 | Loop Ant. | 582-0032 ① | | | | | |
| L2 | Osc. Coil | 113-0044 | | | | | |
| L3 | IF Trans. | 121-0107 | | | | | |

① Includes cabinet back & line cord. Part #582-0033 used in Model 2108.

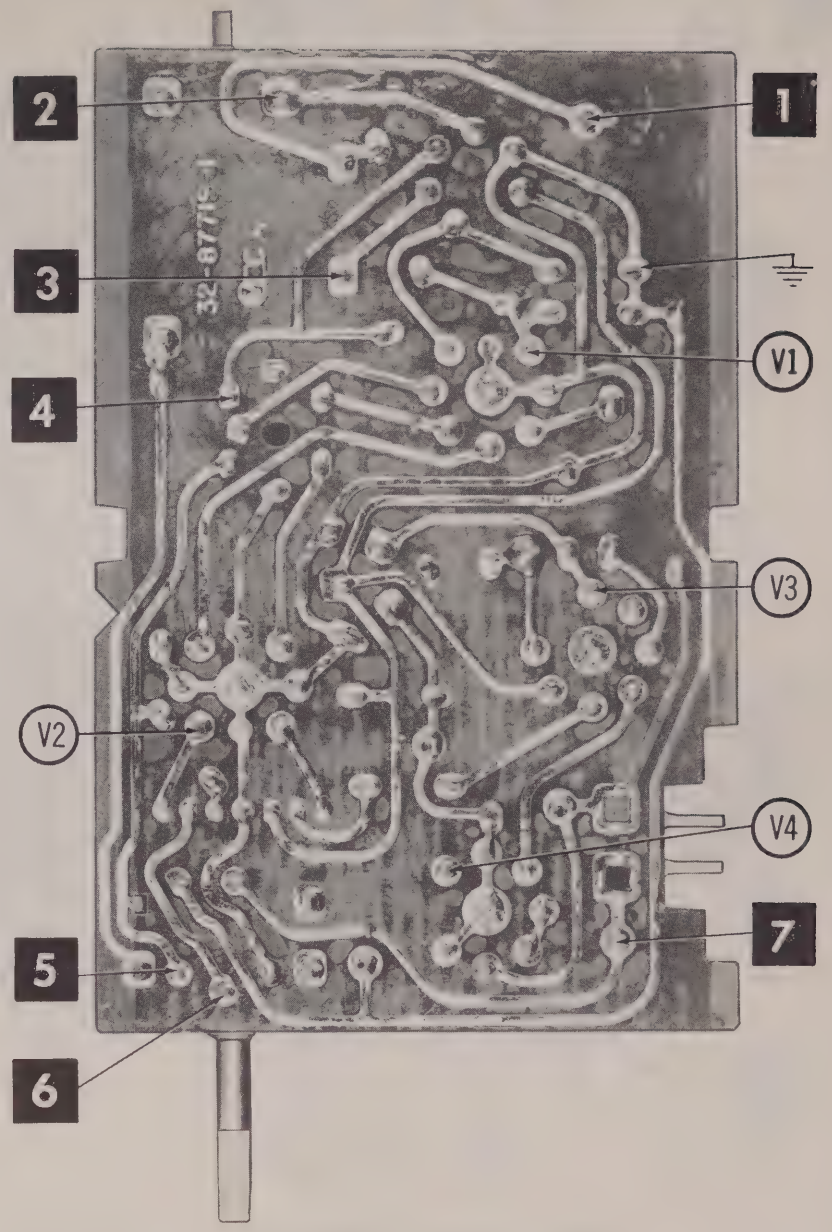
## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | SYLVANIA PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2600Ω | 3-4Ω | 143-0045 ① | Z1101 | A-3025 | AU-605 | A-3332 | 24S53 | S-12X | ① Speaker mounted |

# PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | SYLVANIA PART No. | QUAM PART No. | |
| SP1 | 4" | PM | 3-4Ω | 539-0429 | 4A1 | |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | SYLVANIA PART No. | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Audio Circuit | 100mmf, 100mmf, 100mmf, 125mmf, 5000mmf, 5000mmf, 470K, 470K, 10meg | 190-0028 | |

## MISCELLANEOUS

| ITEM No. | PART NAME | SYLVANIA PART No. | NOTES |
|---|---|---|---|
| M1 | Tuning Cap. Printed Board | 170-0019 32-87719-1 | 2 Gang |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 741-0042 | Tuning |
| Knob | 742-0022 | Volume |
| Knob | 740-0170 | Clock Control, Model 2108 Only |
| Cabinet | 813-0118 | Model 2108 |
| Cabinet | 813-0117 | Model 1107 |
| Crystal | 717-0004 | Clock |
| Face | 721-0020 | Clock |
| Hand | 206-0002 | Minute |
| Hand | 206-0003 | Hour |
| Hand | 206-0004 | Sweep |
| Hand | 206-0005 | Alarm |

## WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

# DISASSEMBLY

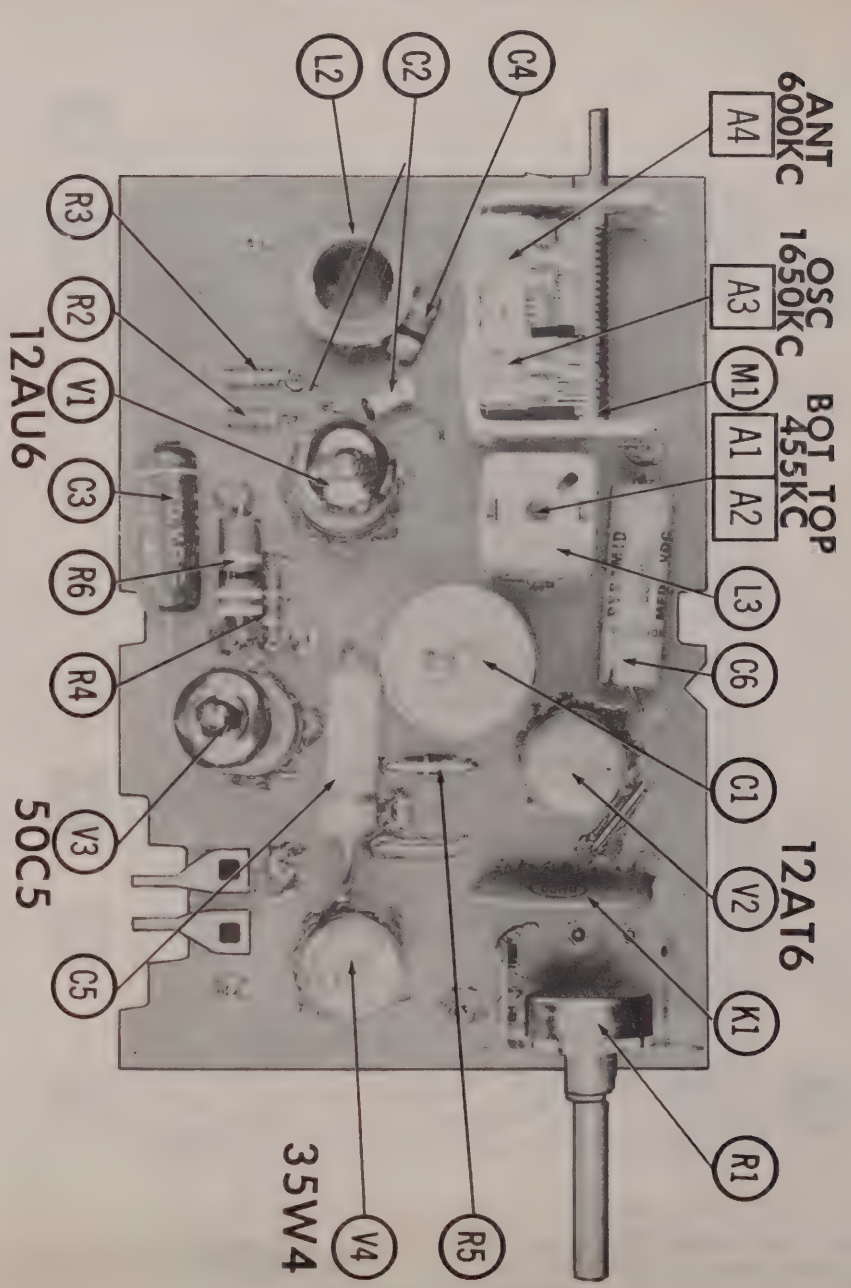
CHASSIS REMOVAL

1. Pull knobs and free from their shafts. Knobs are captive and remain with cabinet.
2. Remove screws holding rear cover. Disengage interlock.
3. Disconnect speaker leads and clock leads (if applicable).
4. Remove screw and clip holding chassis. Remove chassis.

CLOCK REMOVAL (MODEL 2108)

1. Remove chassis from cabinet. (See step 1 above).
2. Pull off On-off-Auto knob.
3. Carefully press side of clock crystal until tabs clear slots in cabinet. Remove crystal.
4. Pull off clock hands.
5. Compress 4 clips holding clock to cabinet. Remove clock.
   (Clock hands may be correctly positioned as follows: Turn alarm set CCW until a click is heard, then stop turning. Place alarm and hour hands pointing at 6 o'clock; the minute and second hand at 12 o'clock).

# CHASSIS—TOP VIEW



PHOTOFACT* Folder

# TRIXETTE MODELS A611, A680, A690, A720

TRIXETTE MODELS A611, A680, A690, A720

MODEL A720

TRIXETTE MODELS A611, A680, A690, A720

| | |
|---|---|
| TRADE NAME | Trixette Models A611, A680, A690, A720 |
| SUPPLIER | Electronics Div., Ercona Corp., 16 W. 46th St., New York 36, N. Y. |
| TYPE SET | AC Operated 3 Tube Phono Amplifier With 4 Speed Automatic Record Changer |
| POWER SUPPLY | 110 - 120 Volts AC, 60 Cycles RATING 48 Watts, .45 Amp. @ 117 Volts AC (Less Motor) |

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE GARRARD RC120/4 - PHOTOFACT SET 355 FOLDER 4 OR RECORD CHANGER MANUAL RC-10.

**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H965

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF Amp. -Output | ECL82/6BM8 | ① |
| V2 | AF Amp. -Output | ECL82/6BM8 | ① |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V3 | Rectifier | EZ80/6V4 | ① |

① Domestic type listed may not be directly interchangeable in some instances.

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | TRIXETTE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | |
| C1A | 32 | 350 | | AFH3-41 | D0120 | FP376.6 | TMT-36 | TVLS-3639.13* | |
| B | 8 | 350 | | | | | | | |
| C | 8 | 350 | | | | | | | |

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TOL | TRIXETTE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | 100 | | | | SI 100 | D6-101 | LT6T1 | UC-531 | 1FM-31 | |
| C3 | .1 | 350 | | | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C4 | .05 | 350 | | | P488N-05 | DF-503 | CUB4S5 | GEM-415 | 4TM-S5 | |
| C5 | .05 | 350 | | | P488N-05 | DF-503 | CUB4S5 | GEM-415 | 4TM-S5 | |
| C6 | .1 | 350 | | | P488N-1 | DF-104 | CUB4P1 | GEM-401 | 4TM-P1 | |
| C7 | 5000 | | | | SI 5000 | D6-502 | LT6D5 | DC525 | 5HK-D5 | |
| C8 | 5000 | | | | SI 5000 | D6-502 | LT6D5 | DC525 | 5HK-D5 | |
| C9 | 100 | | | | 1468-0001 | D6-101 | 22R5T1 | MC235 | 1FM-31 | |
| C10 | .05 | 350 | | | P488N-05 | DF-503 | CUB4S5 | GEM-415 | 4TM-S5 | |
| C11 | .05 | 350 | | | P488N-05 | DF-503 | CUB4S5 | GEM-415 | 4TM-S5 | |
| C12 | 5000 | | | | SI 5000 | D6-502 | LT6D5 | DC525 | 5HK-D5 | |
| C13 | 5000 | | | | SI 5000 | D6-502 | LT6D5 | DC525 | 5HK-D5 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | TRIXETTE PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 1meg | ½ | W517 | B-70 | A47-1meg-Z | Q13-137 | U53 | Volume |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |
| R2A | 1meg | ½ | | B-69 | A47-1meg-S | Q11-137 | U54 | Bass |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |
| R3A | 500K | ½ | 048 | BT-65 | A47F5-500K | Q19-133X | UT431 | Treble, Tap@250K |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-2 or KR-2* | SWE-20 | 76-2 | US-27 | |

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

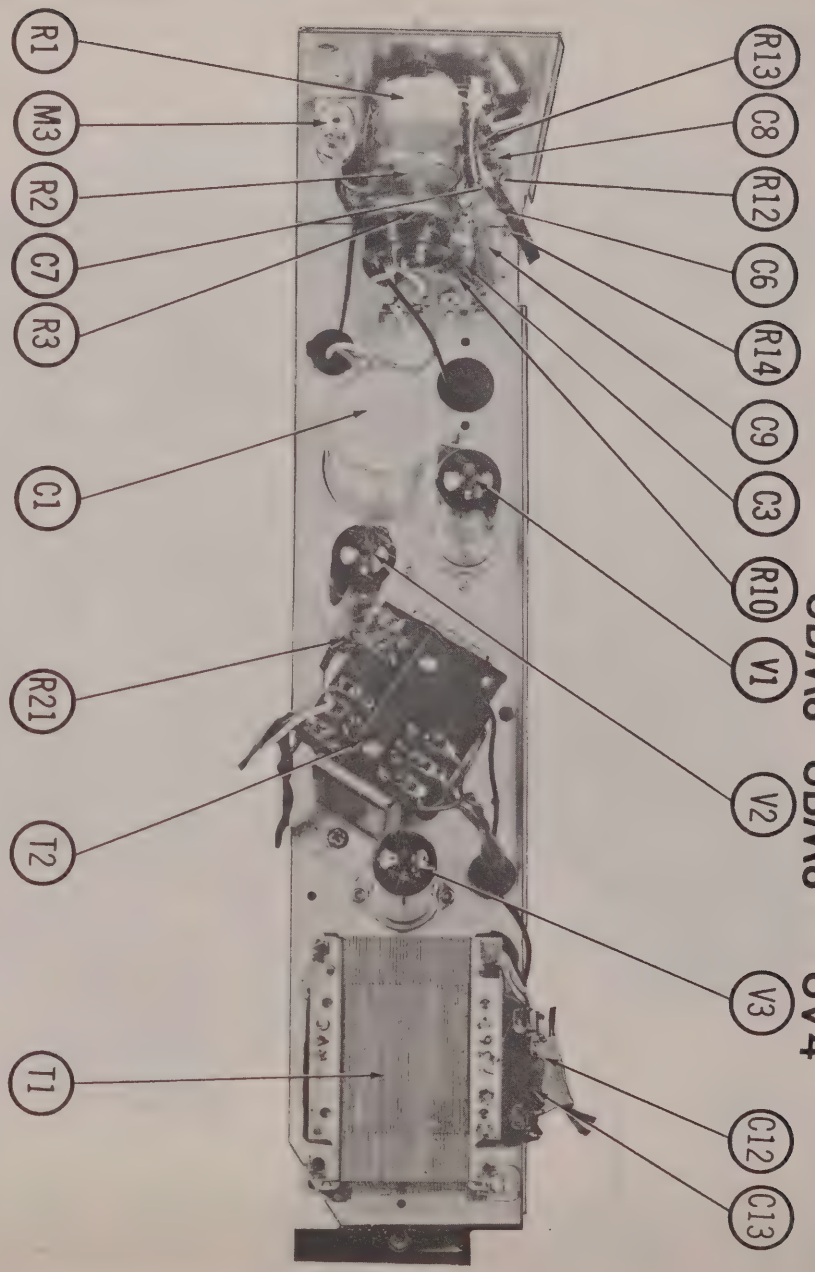
## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | TRIXETTE PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R4 | 1meg | | | |
| R5 | 1meg | | | |
| R6 | 100K | | | |
| R7 | 22K | | | |
| R8 | 1500Ω | | | |
| R9 | 100K | | | |
| R10 | 1000Ω | | | |
| R11 | 2200Ω | | | |
| R12 | 100K | | | |
| R13 | 100K | | | |

| ITEM No. | RATING | | TRIXETTE PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R14 | 470K | | | |
| R15 | 10K | | | |
| R16 | 470K | | | |
| R17 | 180Ω | 1 | | |
| R18 | 330Ω | 2 | | |
| R19 | 10K | | | |
| R20 | 470K | | | |
| R21 | 1500Ω | | | |
| R22 | 4700Ω | | | |
| R23 | 4700Ω | | | |

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | TRIXETTE PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 225V Tap ⓐ 117V ⓐ .45A | 440VCT ⓐ .080A | 6.3V ⓐ 2.1A | G7360 | | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | TRIXETTE PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 5700Ω CT | 1-2Ω | H-4150① | Z1011 | A-2901② | AU-609 | A-3870 | 24S55 | S-55X | ① Alternate Part # E-848, G-7339 |
| | | SEC 2 | | | | | | | | ② Drill new mounting hole |
| | | 8Ω Tap ⓐ 1-2Ω | | | | | | | | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | TRIXETTE PART No. | QUAM PART No. | |
| SP1 | 4"X6" | PM | 3-4Ω | S46KK① | 46A1① | ① Parallel And Phase |
| SP2 | 4"X6" | PM | 3-4Ω | S46KK① | 46A1① | |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | TRIXETTE PART No. | ASTATIC PART No. | | JENSEN PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | NEEDLE | |
| M1 | | 310-TB | N8-1 & N8-3 | | | |

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

| ITEM No. | REPLACEMENT DATA | | | REMARKS |
|---|---|---|---|---|
| | TRIXETTE PART No. | JENSEN PART No. | WALCO PART No. | |
| M2 | (78 RPM) | † GA-97 or ♦ GA-97D | † W-99S | † Jewel ♦ Diamond |
| | (LP) | † GA-97LP or ♦ GA-97LPD | † W-99MGS or ♦ W-99MGD | |

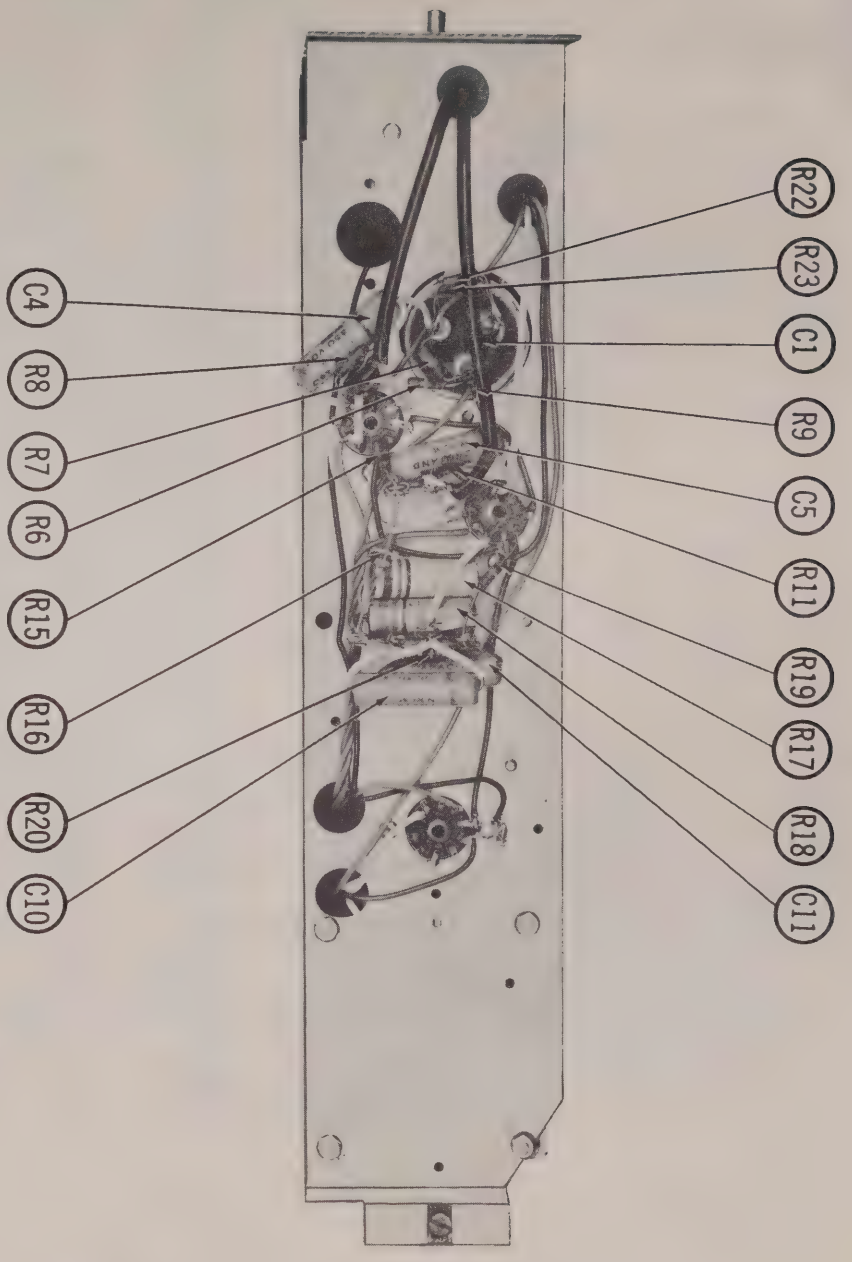
## MISCELLANEOUS

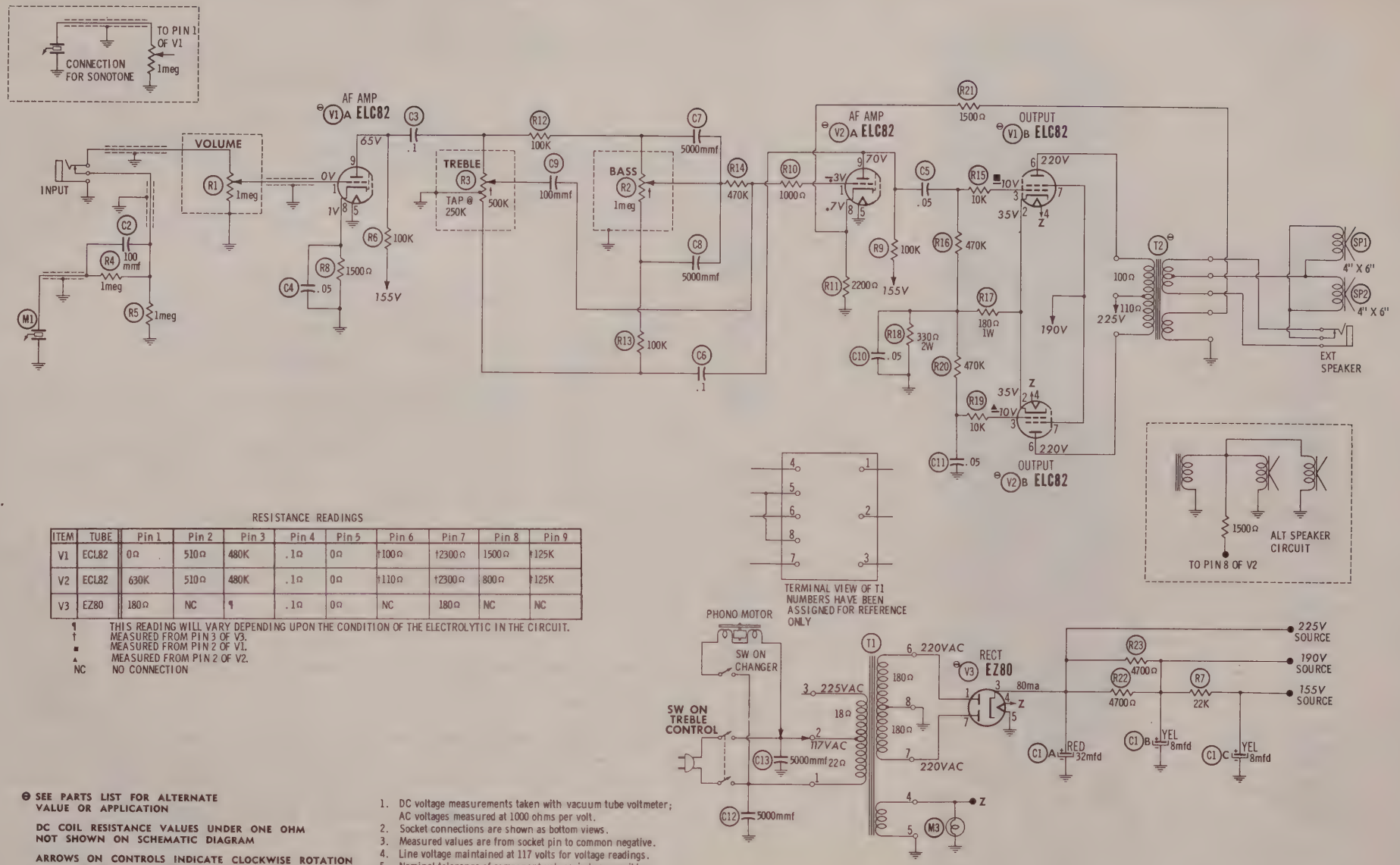
| ITEM No. | PART NAME | TRIXETTE PART No. | NOTES |
|---|---|---|---|
| M3 | Lamp | | 6.3 Volts, .115 Ampere, OSRAM |

## WIRING DATA

| | |
|---|---|
| General-use Unshielded Hook-up Wire | Use BELDEN No. 8530 (Solid) Available in Ten Colors<br>8524 (Stranded) Available in Ten Colors |
| Power Cord | Use BELDEN No. 1765-B (6 Ft. Length)<br>1725-K (7½ Ft. Length) |
| Low-Loss Shielded Lead (Interconnecting) | Use BELDEN No. 8401 |
| Phono Pick-up Arm Cable | Use BELDEN No. 8430 (Two Conductor - Twisted) |

# CHASSIS—BOTTOM VIEW






RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | ECL82 | 0Ω | 510Ω | 480K | .1Ω | 0Ω | †100Ω | †2300Ω | 1500Ω | †125K |
| V2 | ECL82 | 630K | 510Ω | 480K | .1Ω | 0Ω | †110Ω | †2300Ω | 800Ω | †125K |
| V3 | EZ80 | 180Ω | NC | ¶ | .1Ω | 0Ω | NC | 180Ω | NC | NC |

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V3.
■ MEASURED FROM PIN 2 OF V1.
▲ MEASURED FROM PIN 2 OF V2.
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1959

**TRIXETTE MODELS A611, A680, A690, A720**

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# V-M MODELS 1281, 1282

V-M MODELS 1281, 1282

MODEL 1281

MODEL 1282

| | |
|---|---|
| TRADE NAME | V-M Models 1281, 1282 |
| MANUFACTURER | V-M Corp., Benton Harbor, Michigan |
| TYPE SET | AC Operated Phono Amplifier With 4 Speed Automatic Record Changer (Model 1282 Has AM Tuner) |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycles |
| RATING | 48 Watts, .47 Amp. @ 117 Volts AC (Less Motor) Model 1282<br>30 Watts, .29 Amp. @ 117 Volts AC (Less Motor) Model 1281 |
| TUNING RANGE--BROADCAST | 540 - 1670KC |

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M 1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10

## ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

With tuning gang fully closed, position pointer at calibration mark on left end of scale.

Suggested Alignment Tools: A1 thru A4....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A6.....GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .01mfd | High side to pin 7 (grid) of 6BE6 (V4). Low side to chassis. | 455KC (400~ Mod.) | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. |
| 2. | | Loop | 1670KC | " | " | A5 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 1400KC | Tune to 1400KC signal | " | A6 | " |
| 4. | | " | " | " | " | | Adjust for maximum output by SLIGHTLY bending the first set of segments on the tuning gang antenna rotor. |
| 5. | | " | 1000KC | Tune to 1000KC signal | " | | Adjust for maximum output by SLIGHTLY bending the second set of segments on the tuning gang antenna rotor. |
| 6. | | " | 600KC | Tune to 600KC signal | " | | Adjust for maximum output by SLIGHTLY bending the third set of segments on the tuning gang antenna rotor. |
| 7. | Pointer should be within ± 1/16" of the center line of the 600KC, 1000KC, and 1400KC calibration marks. Coverage should include 540KC and 1650KC. If coverage or calibration are incorrect, plates of the oscillator rotor of the tuning gang should be SLIGHTLY bent for maximum output at settings of 600KC, 1000KC, and 1400KC. Repeat steps 3 thru 7. Trimmer cap should not be too tight or loose to cause noise or to vibrate. Turn tuning shaft thru full range and check for rubbing of plates. | | | | | | |

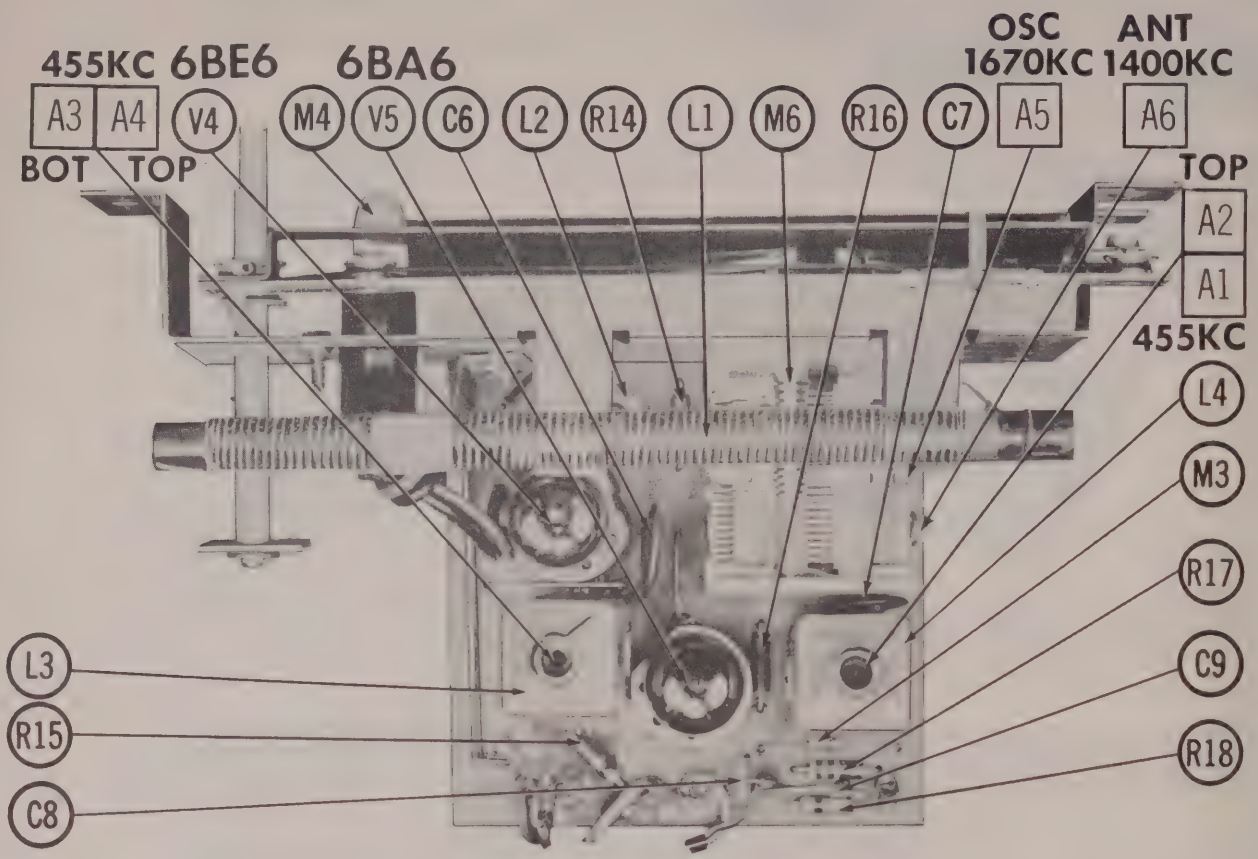
**HOWARD W. SAMS & CO., INC.** Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

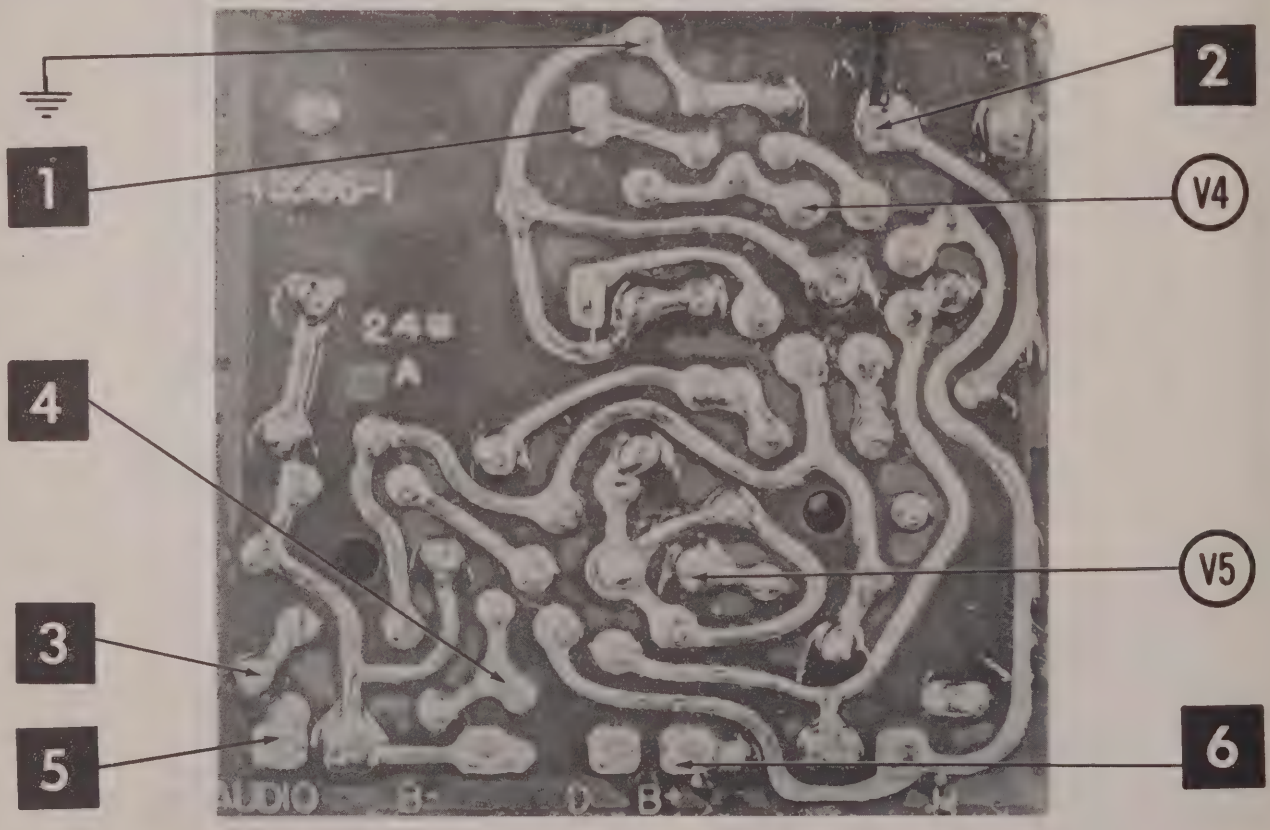
H984



V-M MODELS 1281, 1282
SET 439 FOLDER 17




TUNER CHASSIS - TOP VIEW




A Howard W. Sams CIRCUITRACE* Photo

TUNER PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF Amplifier | 6AU6 | |
| V2 | Output | 6AQ5 | |
| V3 | Rectifier | 6X4 | |
| V4 | AM Converter | 6BE6 | |
| V5 | IF Amplifier | 6BA6 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA V-M PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 40 | 300 | 12086 | | XB0254 | TCT3764 | | TVAS-3565 * | |
| B | 30 | 300 | | | BR1045 | | | | |
| C | 10 | 300 | | | | | | | |
| C2 | 8 | 25NP | 12090 | NP-PRS25V10 | BBR16-90 † | TCN5010 | TD-16-150 † | TVAS-1204.1 * | |
| | | | | | BBR16-90 † | | TD-16-150 † | | |

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
† Connect Negative Leads together.

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | RATING TOL | REPLACEMENT DATA V-M PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C3 | .047 | 400 | | 12009 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | ① |
| C4 | .047 | 400 | | 12009 | P488N-047 | DF-503 | CUB4S47 | GEM-4147 | 4TM-S47 | |
| C5 | 3500 | | | 12058 | BPD-004 | DD-392 | BYA10D4 | B-240 | 5HK-D4 | |
| C6 | 20000 | | | 12114 | BPD-02 | DD-203 | BYB6S2 | B-120 | 5GA-S2 | |
| C7 | 20000 | | | 12114 | BPD-02 | DD-203 | BYB6S2 | B-120 | 5GA-S2 | |
| C8 | 150 | | | 12115 | BPD-00015 | DD-151 | L10T15 | B-315 | 5GA-T15 | |
| C9 | 10000 | | | | BPD-01 | DD-103 | BYA10S1 | B-110 | 5HK-S1 | ② |

① Stereo conversions use .005mfd in this application (Part #12083).
② Some versions may use 500mmf in this application (Part #12064).

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA V-M PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 2meg | ½ | 12354 | B-76 | A47-2meg-Z | Q13-139 | U55 | Volume |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |
| R2A | 1meg | ½ | 12355 | B-70 | A47-1meg-Z | Q13-137 | U53 | Tone |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |

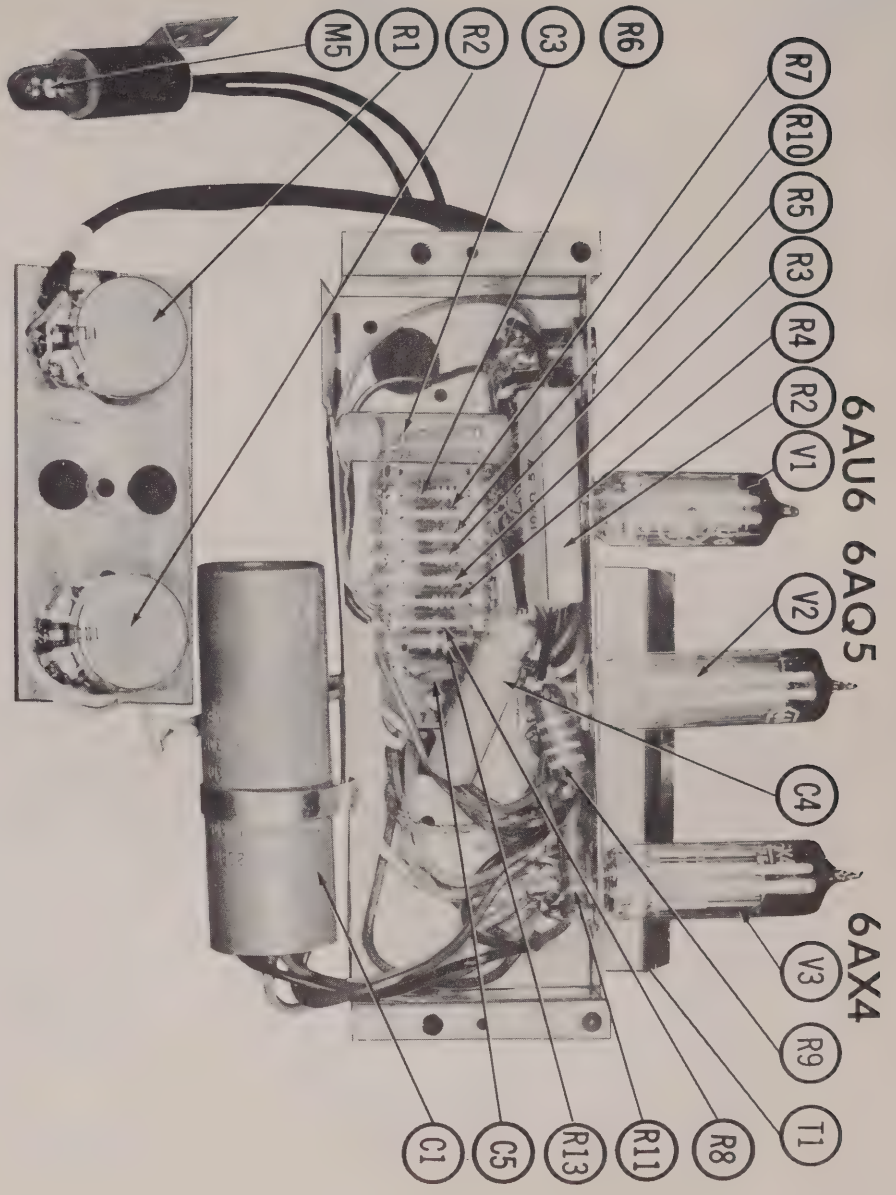
## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | V-M PART No. | NOTES |
|---|---|---|---|---|
| R3 | 15K | | 11013 | Note 1 |
| R4 | 680Ω | | 10693 | |
| R5 | 47K | | 11133 | Note 2 |
| R6 | 330K | | 11333 | Note 3 |
| R7 | 120K | | 11233 | Note 4 |
| R8 | 1meg | | 11453 | |
| R9 | 330Ω | 2 | 10615-10 | |
| R10 | 4700Ω | | 10893 | |
| R11 | 150Ω | 1 | 10534-10 | |
| R12 | 10K | 5 | 12359-10 | Note 5 |
| R13 | 15K | 1 | 11014 | Note 5 |
| R14 | 22K | | 11053 | |
| R15 | 100Ω | | 10495 | |
| R16 | 2.2meg | | 11533 | Note 6 |
| R17 | 47K | | 11133-10 | |
| R18 | 1meg | | 11453 | |

Note 1. Not used in stereo versions.
Note 2. Stereo versions use 120K (Part #11233).
Note 3. Stereo versions use 2.2meg (Part #11533).
Note 4. Stereo versions use 680K (Part #11413).
Note 5. Used in Model 1282 only.
Note 6. Some versions may use 3.3meg in this application (Part #11573).

## AMP CHASSIS-BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | V-M PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | |
| L1 | Loopstick | 45534-2 | | | | | |
| L2 | Osc. Coil | 43644-1 | | | | | |
| L3 | Input IF | 44282-1 | 16-6780 | BC-356 | 13-PC1 | RF-4 | |
| L4 | Output IF | 44282-1 | 16-6780 | BC-357 | 13-PC2 | RF-4 | |

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | V-M PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117V @ .47A | 580VCT @ .070A | 6.3V @ .6A | 12583 (Model 1282) | | | | | | |
| | SEC. 3 | SEC. 4 | SEC. 5 | | | | | | | |
| | 6.3VCT @ 1.6A | | | | | | | | | |
| | PRI. | SEC. 1 | SEC. 2 | | | | | | | |
| | 117V @ .29A | 500VCT @ .050A | 6.3VCT @ 1.2A | 12550 (Model 1281) | | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | V-M PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 5100Ω | 6-8Ω | 12579 | Z1109 | A-2902① | AU-609 | A-3849① | 22S58 | S-55X | ① Drill new mounting holes. |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | V-M PART No. | QUAM PART No. | |
| SP1 | 8" | PM | 6-8Ω | 16756 | 8A21Z8 ① | ① Drill new mounting holes. |
| SP2 | 3½" | PM | 15Ω | 16755 | 3A15T | |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | V-M PART No. | ASTATIC PART No. | | JENSEN PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | NEEDLE | |
| M1 | 14900 | 81-T | | | | |

## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

| ITEM No. | REPLACEMENT DATA | | | REMARKS |
|---|---|---|---|---|
| | V-M PART No. | JENSEN PART No. | WALCO PART No. | |
| M2 | | | | |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | V-M PART No. | CBS PART No. | SYLVANIA PART No. | |
| M3 | 1N34A | 17001 | 1N34A | 1N38A | Detector (Pigtail) |

## MISCELLANEOUS

| ITEM No. | PART NAME | V-M PART No. | NOTES |
|---|---|---|---|
| M4 | Lamp | 4654 | #47 |
| M5 | Lamp | 7791 | #1847 |
| M6 | Tuning Cap. | 45581 | 2 Gang |
| M7 | Switch | 15120 | Tuner-Phono, Slide Type, Model 1282 only |
| M8 | Switch | 467 | Power On-Off (SPST) |
| M9 | Switch | | Muting (DPST, Leaf Type) |
| M10 | Switch | 599 | Monaural-Stereo, SPDT, Slide Type |
| M11 | Motor | 9134 | |
| | Motor Assembly | 18361 | Complete, 110 Volt, 60 Cycle |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 16766-B | Control, 3 used, Model 1282 |
| Knob | 16766-A | Control, 3 used, Model 1281 |
| Knob | 16791-A46 | On-Off-Reject |
| Knob | 16792-A46 | Speed Control |
| Knob | 6071 | Lid Stay Adjustment |
| Case | 16743-A | Complete, Model 1282 |
| Case | 16744-A | Complete, Model 1281 |

## WIRING DATA

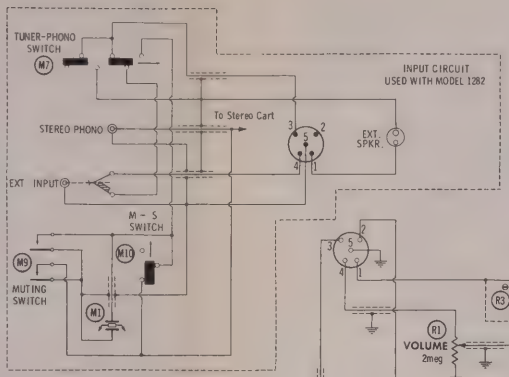
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

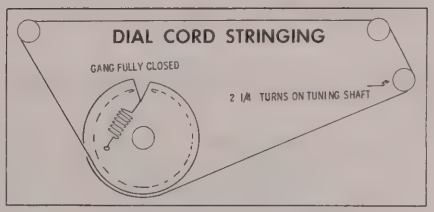
## RESISTANCE READINGS

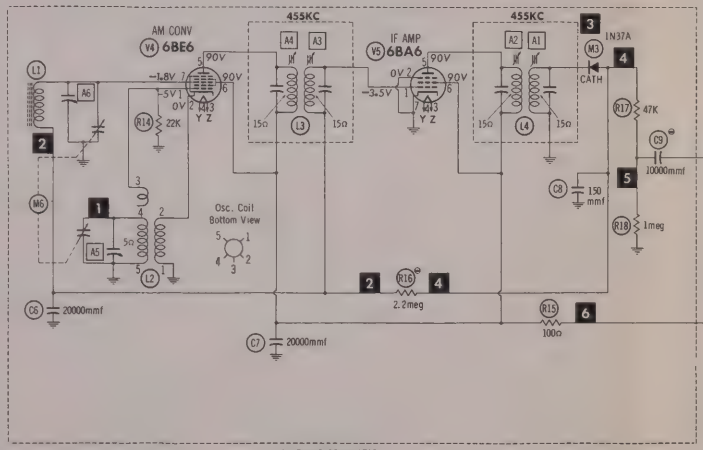
| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 6AU6 | 0Ω | 680Ω | .1Ω | 1Ω | †125K | †335K | 680Ω |
| V2 | 6AQ5 | 1meg | 330Ω | .1Ω | 1Ω | †750Ω | †150Ω | 1meg |
| V3 | 6X4 | 220Ω | TP | .1Ω | .1Ω | TP | 240Ω | ¶ |
| V4 | 6BE6 | 22K | 4Ω | .1Ω | .1Ω | †10K | †10K | 3.2meg |
| V5 | 6BA6 | 3.2meg | 0Ω | 1Ω | 1Ω | †10K | †10K | 0Ω |

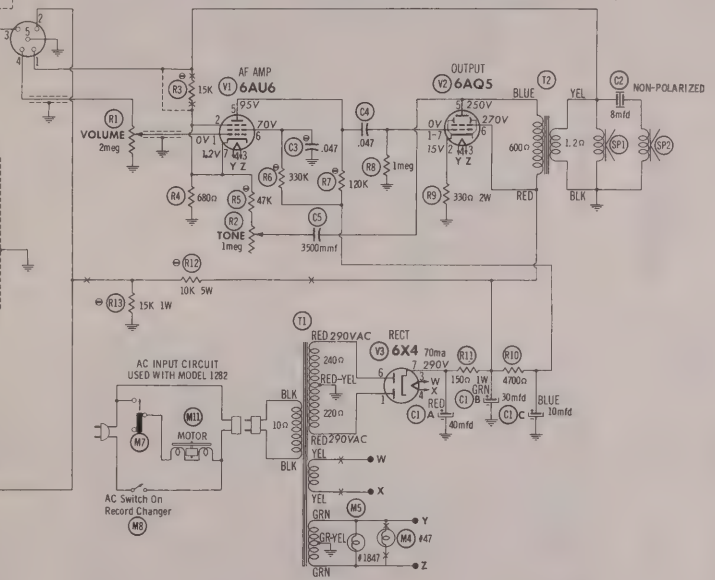
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V3.
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

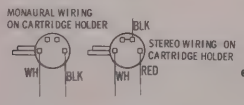


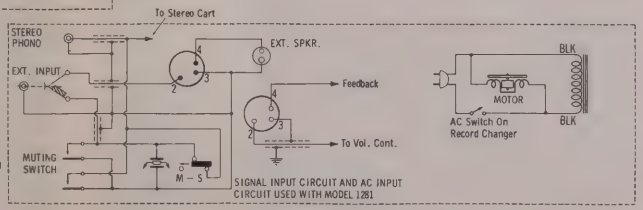

AM TUNER SCHEMATIC USED WITH MODEL 1282




⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)




A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE™

© Howard W. Sams & Co., Inc. 1959

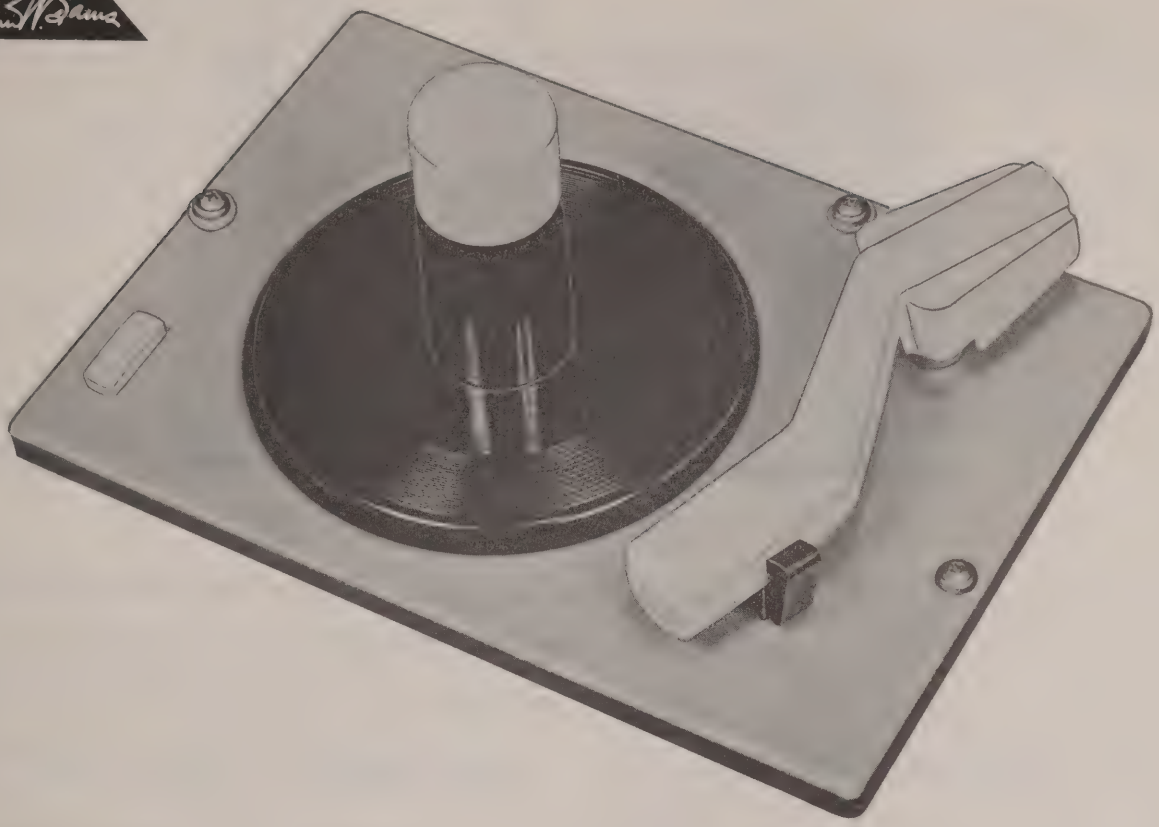
**V-M MODELS 1281, 1282**

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

**WESTINGHOUSE MODEL RP190F**

**WESTINGHOUSE MODEL RP190F**



**WESTINGHOUSE MODEL RP190F**

## GENERAL INFORMATION

Westinghouse Model RP190F record changers will play and change in automatic sequence, up to twelve 7-inch, 45-rpm records at a single loading.

The Model RP190F uses a velocity trip; its operation depends upon the speed at which the tone arm approaches the center of the record, and not upon any predetermined dimension from the center spindle.

The cartridge used is an Astatic 414A (Part No. 690V018H61), and the needle is an Astatic N8-1 (LP) (Part No. 690V018H59).

The motor operates on 117 volts, 60 cycles AC.

Westinghouse Electric Corporation
Radio-Television Division
Metuchen, New York

*This material compiled and published by*

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

Copyright 1959 • All Rights Reserved

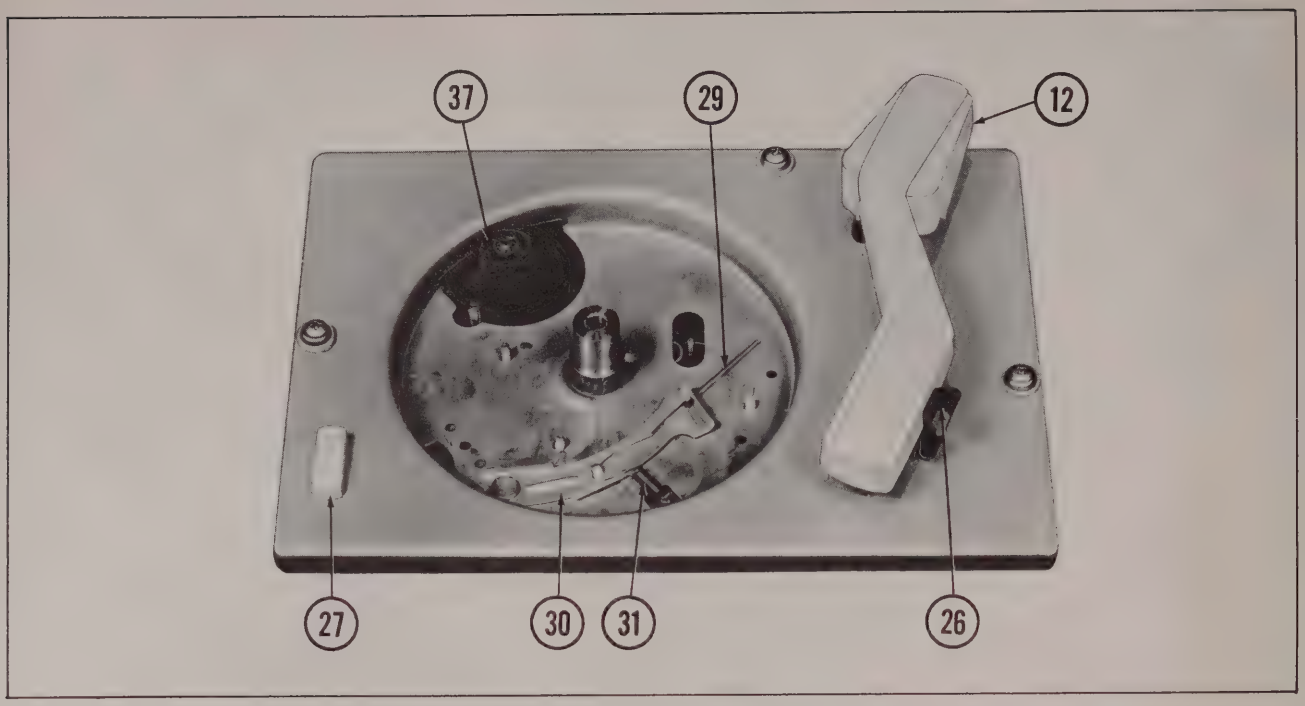



Fig. 1. Top View — Turntable Removed

## AUTOMATIC OPERATION

1. Insert the pin plug into the phone jack of a radio or other amplifier.

2. Insert the power plug into a convenient wall receptacle supplying 115 volts, 60 cycles AC.

3. Place the changer on a flat surface, making sure the changer is level.

4. Remove the cardboard tube from pickup arm and lower the pickup arm onto the arm rest.

5. Place up to twelve 7" fine-groove records on the spindle, allowing them to rest on record supports (4).

6. Turn amplifier On-Off knob to On position.

7. Pull control knob (27) forward until a click is heard; this turns the motor on and starts the turntable rotating. By pulling control knob (27) all the way forward, the mechanism is tripped and the automatic operation begins. The entire stack of records is then played, in sequence, on one side only. The volume and tone are regulated by the controls on the instrument to which the changer is attached.

8. To reject a record while it is playing, pull control knob (27) forward and release.

9. To repeat a record being played, remove all other records from separator shelf (4). The remaining record will repeat until additional records are placed on the spindle or until control knob (27) is moved to the Off position.

CAUTION:

1. Do not handle the pickup arm while the mechanism is in cycle.

2. Do not use force to release a jam.

3. Do not try to remove any records on the turntable if the mechanism is stopped in cycle.

4. If separator knives (3) protrude from the center post when the mechanism is out of cycle, move control knob (27) to Reject.

## CHANGE CYCLE

The change cycle is started by pulling control knob (27) to the Reject position. This actuates reject lever (30), moving reject lever spring (29) against stud (73A) of eccentric cycling cam (73). A slight movement of the eccentric cycling cam is sufficient for the cycling cam to engage rotating knurled roller (57), mounted on the turntable shaft.

Cycling cam wheel (73), mounted on cycling slide (80), pushes the slide in the direction of the pickup arm pivot. As slide (80) moves toward the pivot point, spring (74) tension is increased.

As slide (80) continues to move back, incline (80C) moves against elevating rod (23) and, in turn, raises the pickup arm from the record. The step in the slide then engages stud (X) of trip lever (67), pivoting the lever and pickup arm outward (see Fig. 3). At the same time, eccentric landing adjustment screw (68) contacts and pushes pickup arm return lever (61) against the tension of return spring (62).

As cycling slide (80) reaches its full limit of travel, stop dog (80B), mounted on the slide, engages rotating ratchet wheel (75). Ratchet wheel (75) and separator shaft (7) then remain stationary as the turntable continues to rotate. The separator shelves and knives are so coupled that the flattened end of separator shaft (7) pushes separator knives (3) out, which in turn pulls the opposite shelves in. As shelves (4) recede, separator knives (3), above the shelves, move out and separate the lower record of the stack, and support the remaining records while the lower record drops to the turntable.

At this point, because of the shape of eccentric cycling wheel (73) and the tension of spring (74), slide (80) moves away from the pickup arm pivot. Stud (X) on trip lever assembly (67) follows the slide because of the force produced by spring (62) on return lever (61). After the slide has moved back a short distance, landing adjustment stud (68) engages the step on the end of return lever (61), pulling stud (X) away from the slide. At this point, the pickup is directly above the point of landing.

Elevating rod (23) now rides down incline (80C), lowering the pickup arm to the record. At approximately the same time, stud (80D) pushes against the pickup return lever to permit free motion of the pickup arm.

The change cycle is completed as the slide moves against stop bracket (43), at which time knurled roller (57) rotates in the cutaway section of cam (73).

As the pickup arm moves toward the center of the record, trip lever assembly (67) is pivoted inward. When the needle enters the cycling groove of the record, trip (67A) contacts flange (73B) and pushes it slightly. This slight movement of the cycling cam causes it to engage rotating knurled roller (57), thereby starting a new change cycle.

## ADJUSTMENTS

### Pickup Arm Setdown (Refer to Fig. 3)

Normally, the pickup arm setdown is adjusted by eccentric landing adjustment stud (68), which gives approximately a 1/4" movement. However, if the pickup arm has been removed, adjust as follows:

1. Rotate adjustment stud (68) to a midway position.

2. With the changer out of cycle and clamp screw (21) loose, place the pickup arm on the arm rest; tighten clamp screw (21) enough that clamp (20) will not slip on the pickup arm shaft.

3. With the power removed, pull control knob (27) to the Reject position; then manually rotate the turntable clockwise until the pickup arm starts to lower.

4. Loosen clamp screw (21). Hold trip lever assembly (67) so that adjusting stud (68) engages the step in return lever (61); then move the pickup arm until the stylus is directly above the starting groove of the record. Tighten clamp screw (21), being careful not to move the pickup arm.

5. A fine adjustment can now be made with eccentric landing stud (68).

### Pickup Arm Height (Refer to Fig. 3)

Height adjustment is correct when the stylus clears the turntable by approximately 1 1/8" during the change cycle. This adjustment is determined by turning knurled nut (71). Turning this nut in raises the pickup arm, and turning it out lowers the arm.

NOTE: If pickup arm cannot be adjusted for proper height, cut a few turns from compression spring (70) to allow more space on the shaft.

### Tripping (Refer to Fig. 3)

The tripping point of the changer is adjusted by trip adjustment stud (64). Stud (64) should be adjusted so that the mechanism will be put into cycle when the needle enters the eccentric cycling groove of the record.

### Mounting Bracket (Refer to Fig. 3)

Loosen both mounting screws (45) and move bracket (43) backward or forward until the cutaway section of cycling cam (73) clears knurled roller (57) by approximately 1/16". Tighten the screws. When making this adjustment, keep bracket (43) as perpendicular to slide (80) as possible.

### Stop Dog (Refer to Fig. 3)

During the change cycle, stop dog (80B) engages ratchet wheel (75), which in turn actuates the spindle assembly, thereby dropping a record to the turntable. When stop dog (80B) is properly adjusted, the record should drop to the turntable without striking the pickup arm. This adjustment is made by turning eccentric screw (47).

## LUBRICATION

Lubricants applied during manufacture should last for a long time. However, due to extreme usage, dust, lint, or excessive heat, it may be necessary to clean the unit with a suitable cleaning solvent and to lubricate, as follows:

Use a light machine oil (SAE #10) on bearings of drive motor.

Use Sta-Put #320 or equivalent on all bearing surfaces except motor bearings.

Use Sta-Put #512 or equivalent on all other sliding surfaces.

NOTE: Do not oil or grease the record separator shelves. Remove any grease or oil from turntable rim or rubber surfaces of idler wheel (37) with a suitable cleaning solvent.

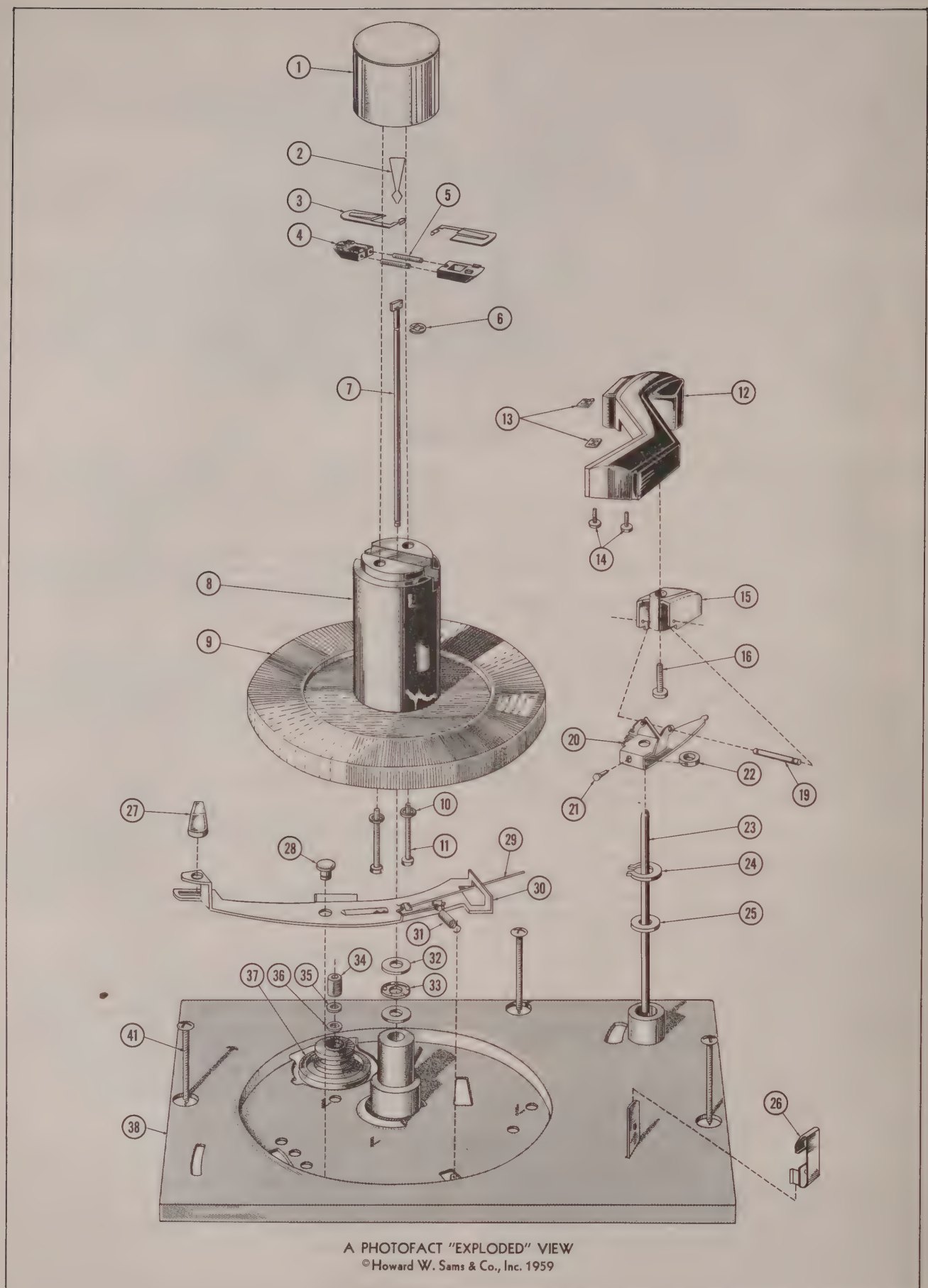



Fig. 2A. Exploded View of Parts Above Baseplate.

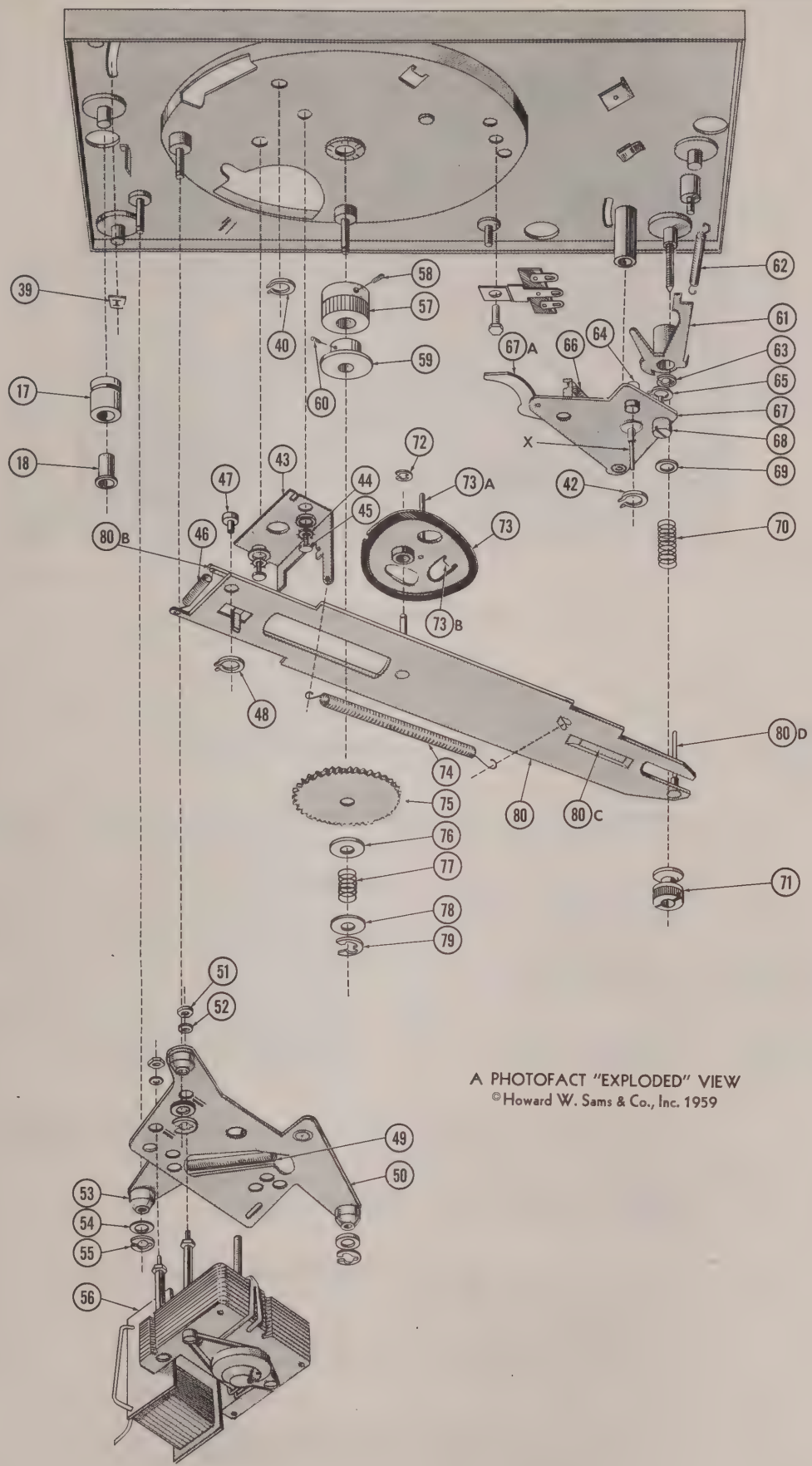



Fig. 2B. Exploded View of Parts Below Baseplate.

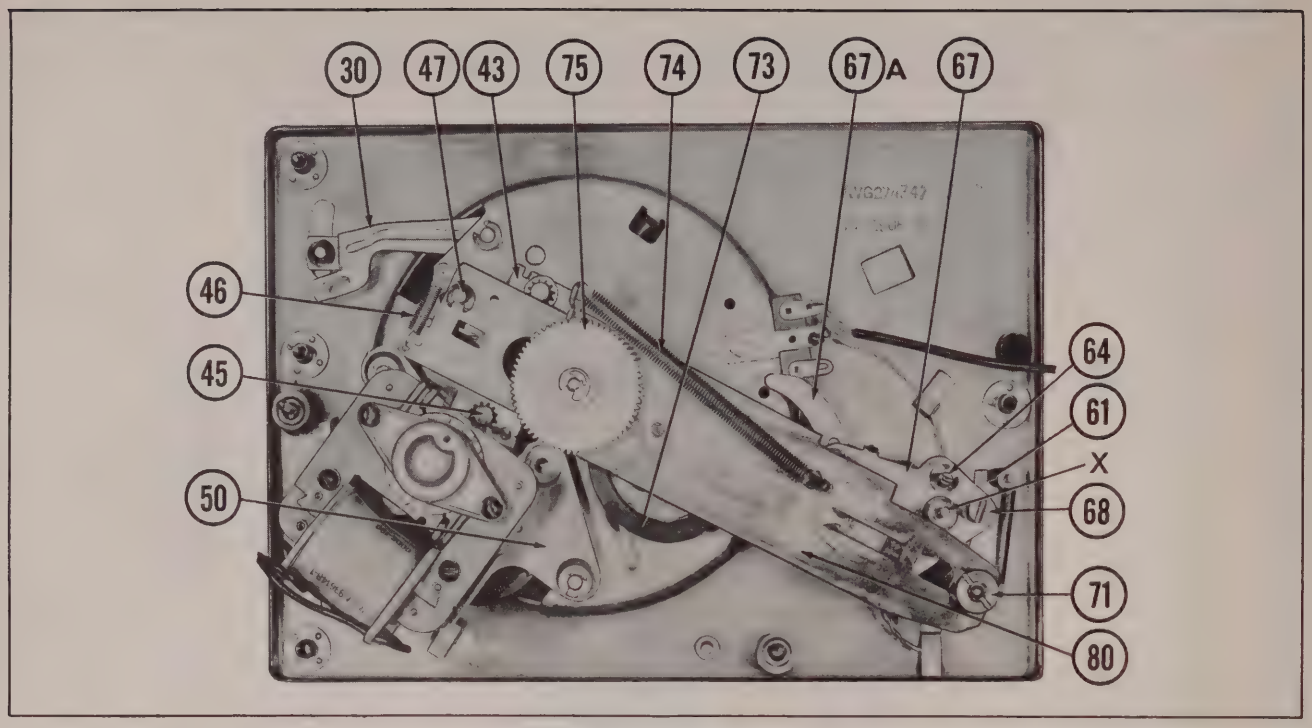



Fig. 3. Bottom View

TROUBLE CHART

| Symptom | Cause | Remedy |
|---|---|---|
| Pickup arm does not set down properly. | 1. Spring (62) loose or missing. | 1. Replace spring (62). |
| | 2. Pickup arm not adjusted properly. | 2. See "Pickup Arm Setdown" under "Adjustments." |
| | 3. Pickup arm swivel (20) loose on shaft. | 3. See "Pickup Arm Setdown" under "Adjustments." |
| Pickup arm does not clear a stack of records on turntable. | 1. Pickup arm height not adjusted properly. | 1. See "Pickup Arm Height" under "Adjustments." |
| Records hit pickup arm while dropping to turntable. | 1. Stop dog (80B) not adjusted properly. | 1. See "Stop Dog" under "Adjustments." |
| | 2. Pickup arm swivel (20) not adjusted properly. | 2. See "Pickup Arm Setdown" under "Adjustments." |
| Records do not drop to turntable. | 1. Spring (46) loose or missing. | 1. Replace spring (46). |
| | 2. Thrust spring (77) broken thereby not maintaining the necessary frictional contact between the ratchet (75) and the friction collar (59). | 2. Replace thrust spring (77). |
| | 3. Stop dog (80B) binds in outward position. | 3. Clean and lubricate. |
| | 4. Friction collar (59) loose. | 4. Tighten set screw (60). |

## TROUBLE CHART (Cont.)

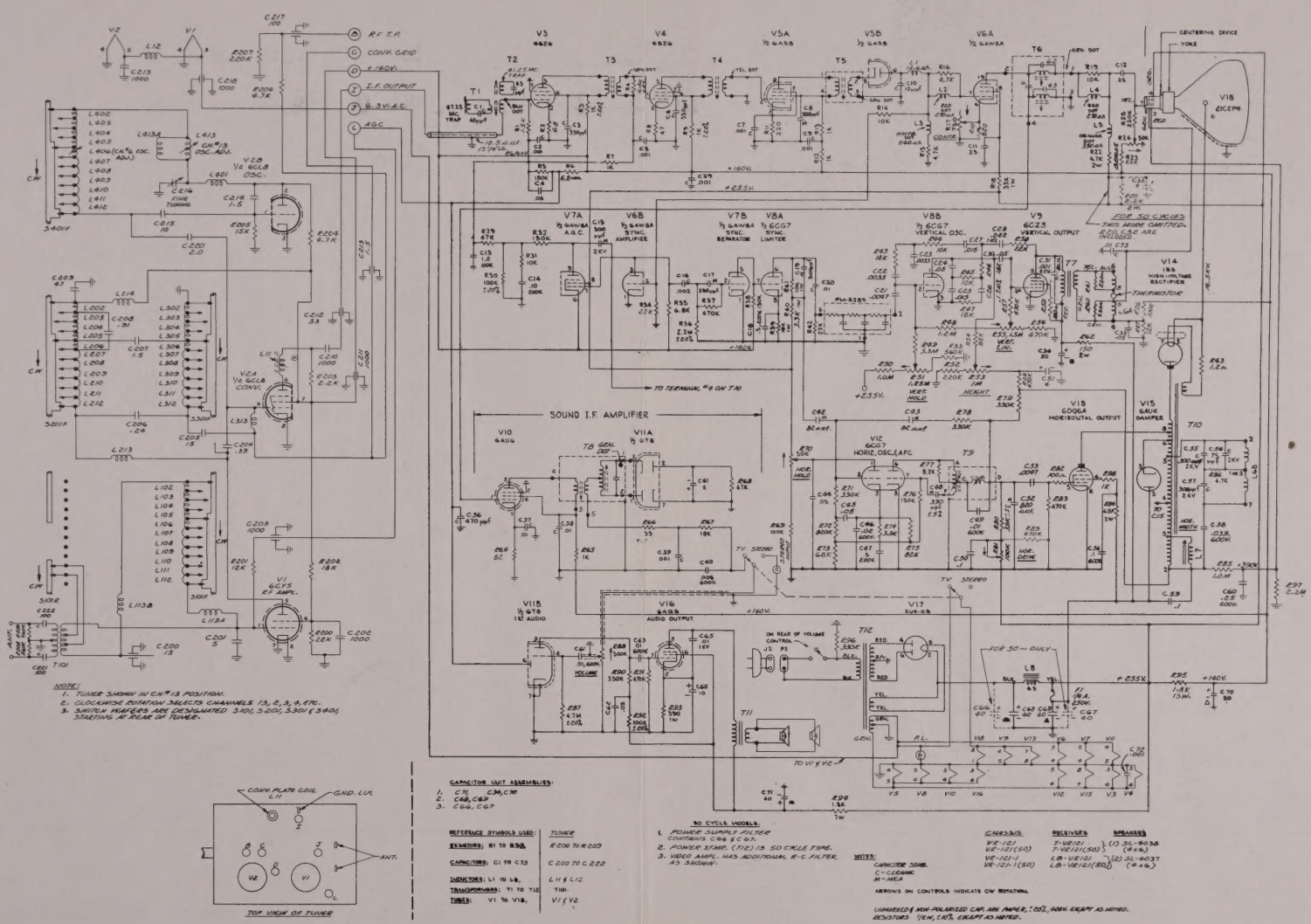
| Symptom | Cause | Remedy |
|---|---|---|
| Distorted output, or no output. | 1. Defective pickup cartridge. | 1. Replace pickup cartridge. |
| | 2. Defective stylus. | 2. Replace stylus. |
| | 3. Shorted pickup leads. | 3. Correct shorted condition. |
| Pickup skips grooves. | 1. Defective stylus. | 1. Replace stylus. |
| | 2. Binding in pickup arm shaft. | 2. Clean and lubricate trip lever shaft (67). |
| | 3. Stud (80D) loose, bent, or missing. | 3. Repair stud (80D) or replace cycling slide assembly (80). |
| Mechanism does not trip automatically. | 1. Tab (73) bent. | 1. Straighten tab (73) so that it is perpendicular to cam. |
| | 2. Defective cycling cam (73). | 2. Replace cycling cam (73). |
| | 3. Cycling cam (73) binds on shaft. | 3. Clean shaft and lubricate with a light oil. |
| | 4. Knurled roller (57) loose on turntable shaft. | 4. Tighten set screw (58). |
| | 5. Tripping stud (64) not properly adjusted. | 5. See "Tripping" under "Adjustments." |
| | 6. Trip lever spring (66) loose or missing. | 6. Replace trip lever spring (66). |
| Trips continuously. | 1. Mounting and stop bracket (43) not adjusted properly. | 1. See "Mounting Bracket" under "Adjustments." |
| | 2. Cam shaft on cycling wheel (73) bent. | 2. Straighten cam shaft or replace cycling wheel (73). |
| Does not complete the change cycle. | 1. Slide assembly return spring (74) loose or missing. This spring holds cycling wheel (73) against knurled roller (57). | 1. Replace slide assembly return spring (74). |
| | 2. Knurled roller (57) loose. | 2. Tighten set screw (58). |
| Wow. | 1. Defective turntable bearing (33). | 1. Replace turntable bearing (33). |
| | 2. Mounting carriage (50A) for idler wheel binds. | 2. Correct binding condition or replace motor mounting plate (50). |
| | 3. Insufficient spring (49) tension or spring (49) disconnected. | 3. Connect or replace spring (49). |
| | 4. Oil or grease on turntable rim and idler wheel. | 4. Clean with a suitable cleaning solvent. |

# PARTS LIST

When ordering parts specify part number, description and model number. Do not order by model number alone. All prices are subject to change without notice.

| Ref No. | Part Number | Description | List Price |
|---|---|---|---|
| 1 | 690V016H12 | Spindle Cap | .60 |
| 2 | 690V016H00 | Spindle Nose Spring | .16 |
| 3 | 690V016H01 | Separator Knife | .10 |
| 4 | 690V016H02 | Separator Shelf | .10 |
| 5 | 690V016H03 | Separator Shelf Return Spring | .06 |
| 6 | 690V016H04 | "C" Washer | .04 |
| 7 | 690V016H05 | Separator Shaft with Cam | .60 |
| 8 | 690V016H13 | Turntable (includes item 9) | 3.00 |
| 9 | | Turntable Disc | |
| 10 | 690V016H08 | No. 6 Flat Washer | .04 |
| 11 | 690V016H08 | No. 6-32 x 1" Fillister Head Machine Screw | .10 |
| 12 | 690V016H18 | Tone Arm (includes item 15) | 1.00 |
| 13 | | Speed Nut | |
| 14 | 690V016H14 | Screw, Cartridge Mounting | .04 |
| 15 | | Counterbalance Weight | |
| 16 | | No. 6 x 11/16" Fillister Head Screw | |
| 17 | 690V016H62 | Eyelet, Shock Mounting | |
| 18 | 690V016H63 | Grommet, Shock Mounting | |
| 19 | | Pin, Swivel Hinge | |
| 20 | 690V016H19 | Pickup Arm Swivel | 1.30 |
| 21 | 690V016H20 | Collar Screw | .04 |
| 22 | | Collar | |
| 23 | 690V016H46 | Rod, Elevating | .28 |
| 24 | 690V016H21 | "C" Washer | .04 |
| 25 | 690V016H22 | Washer, Pickup Arm | .06 |
| 26 | 690V016H60 | Spring Clip, Tone Arm Rest | |
| 27 | 690V016H06 | Knob, Control | .24 |
| 28 | 690V016H11 | Stud, Reject Lever | .60 |
| 29 | 690V016H16 | Spring, Reject Lever | .06 |
| 30 | 690V016H07 | Lever, Reject | .42 |
| 31 | 690V016H17 | Spring, Reject Lever Return | .10 |
| 32 | 690V016H10 | Washer, Thrust Bearing | .04 |
| 33 | 690V016H15 | Bearing, Thrust | .18 |
| 34 | 690V016H24 | Retainer, Idler Wheel | .10 |
| 35 | 690V016H25 | Washer, Idler Wheel | .10 |
| 36 | 690V016H27 | Washer, Idler Wheel | .04 |
| 37 | 690V016H26 | Idler Wheel | .90 |
| 38 | | Baseplate | |
| 39 | 690V016H33 | Nut, Control Knob | .04 |

| Ref. No. | Part Number | Description | List Price |
|---|---|---|---|
| 40 | 690V016H34 | "C" Washer | .18 |
| 41 | 690V016H61 | Mounting Screw | |
| 42 | | "C" Washer | |
| 43 | 690V016H40 | Bracket, Cycling Assy. Mtg. | .30 |
| 44 | | No. 8 External Tooth Lockwasher | |
| 45 | 690V016H41 | Screw, Mounting | .04 |
| 46 | 690V016H55 | Spring | .10 |
| 47 | 690V016H56 | Stud | .22 |
| 48 | | Spring Washer | |
| 49 | 690V016H28 | Spring, Idler Wheel | .18 |
| 50 | 690V016H29 | Plate, Idler Wheel Mtg. | .94 |
| 51 | | No. 6-32 Hex Nut | |
| 52 | | No. 6 Split Lockwasher | |
| 53 | 690V016H30 | Grommet, Idler Wheel Plate | .06 |
| 54 | 690V016H31 | Washer, Idler Wheel Plate | .18 |
| 55 | | "C" Washer | |
| 56 | 690V016H32 | Motor | 10.50 |
| 57 | 690V016H42 | Knurled Roller, Cycling | .50 |
| 58 | 690V016H43 | Screw, Tension | .10 |
| 59 | 690V016H35 | Collar, Turntable Shaft | .46 |
| 60 | 690V016H36 | Screw, Collar | .12 |
| 61 | 690V016H45 | Lever, Pickup Arm Return | .30 |
| 62 | 690V016H44 | Spring, Pickup Arm Return | .10 |
| 63 | | "C" Washer | |
| 64 | 690V016H47 | Stud, Tripping | .30 |
| 65 | | Spring Washer | |
| 66 | 690V016H53 | Spring | .16 |
| 67 | 690V016H48 | Lever, Trip Assy. | 3.48 |
| 68 | 690V016H49 | Stud, Trip Lever | .24 |
| 69 | | Flat Washer | |
| 70 | 690V016H50 | Spring, Clip | .04 |
| 71 | 690V016H58 | Nut | .40 |
| 72 | | "C" Washer | |
| 73 | 690V016H54 | Cam Wheel | .90 |
| 74 | 690V016H57 | Spring | .06 |
| 75 | 690V016H37 | Wheel, Ratchet | .30 |
| 76 | 690V016H38 | Washer, Turntable Shaft | .18 |
| 77 | 690V016H39 | Spring, Turntable Shaft | .04 |
| 78 | 690V016H38 | Washer, Turntable Shaft | .18 |
| 79 | | "C" Washer | |
| 80 | 690V016H51 | Slide, Cycling | .90 |




NOTE:
1. TUNER SHOWN IN CH.# 13 POSITION.
2. CLOCKWISE ROTATION SELECTS CHANNELS 13, 2, 3, 4, ETC.
3. SWITCH WAFERS ARE DESIGNATED S301, S201, S301 & S401, STARTING AT REAR OF TUNER.

CAPACITOR UNIT ASSEMBLIES:
1. C71 C36, C70
2. C68, C69
3. C66, C67

REFERENCE SYMBOLS USED: TUNER
RESISTORS: R1 TO R94 R200 TO R209
CAPACITORS: C1 TO C73 C200 TO C222
INDUCTORS: L1 TO L8, L11 & L12
TRANSFORMERS: T1 TO T12 TIOI
TUBES: V1 TO V18, V1 & V2

50 CYCLE MODELS:
1. POWER SUPPLY FILTER CONSISTS OF C66 & C67.
2. POWER XFMR. (T12) IS 50 CYCLE TYPE.
3. VIDEO AMPL. HAS ADDITIONAL R-C FILTER, AS SHOWN.

NOTES:
CAPACITOR CODE:
C - CERAMIC
M - MICA
ARROWS ON CONTROLS INDICATE CW ROTATION.
UNMARKED & NON-POLARIZED CAP. ARE MICA, 500 V., 400% EXCEPT AS NOTED.
RESISTORS 1/2 W., 10% EXCEPT AS NOTED.

CABINETS: RECEIVERS: SPEAKERS:
VR-121 T-VR121 (1) 3L-9038
VR-121(50) T-VR121(50) (#24)
VR-121-1 LB-VR121 (2) 3L-9037
VR-121-1(50) LB-VR121(50) (#16)

ANDREA MODELS LB-VR121, LB-VR121(50), T-VR121, T-VR121(50)(Ch. VR-121, VR-121(50), VR-121 -1, VR-121-1(50)

Schematic Diagram Courtesy of ANDREA RADIO CORP.

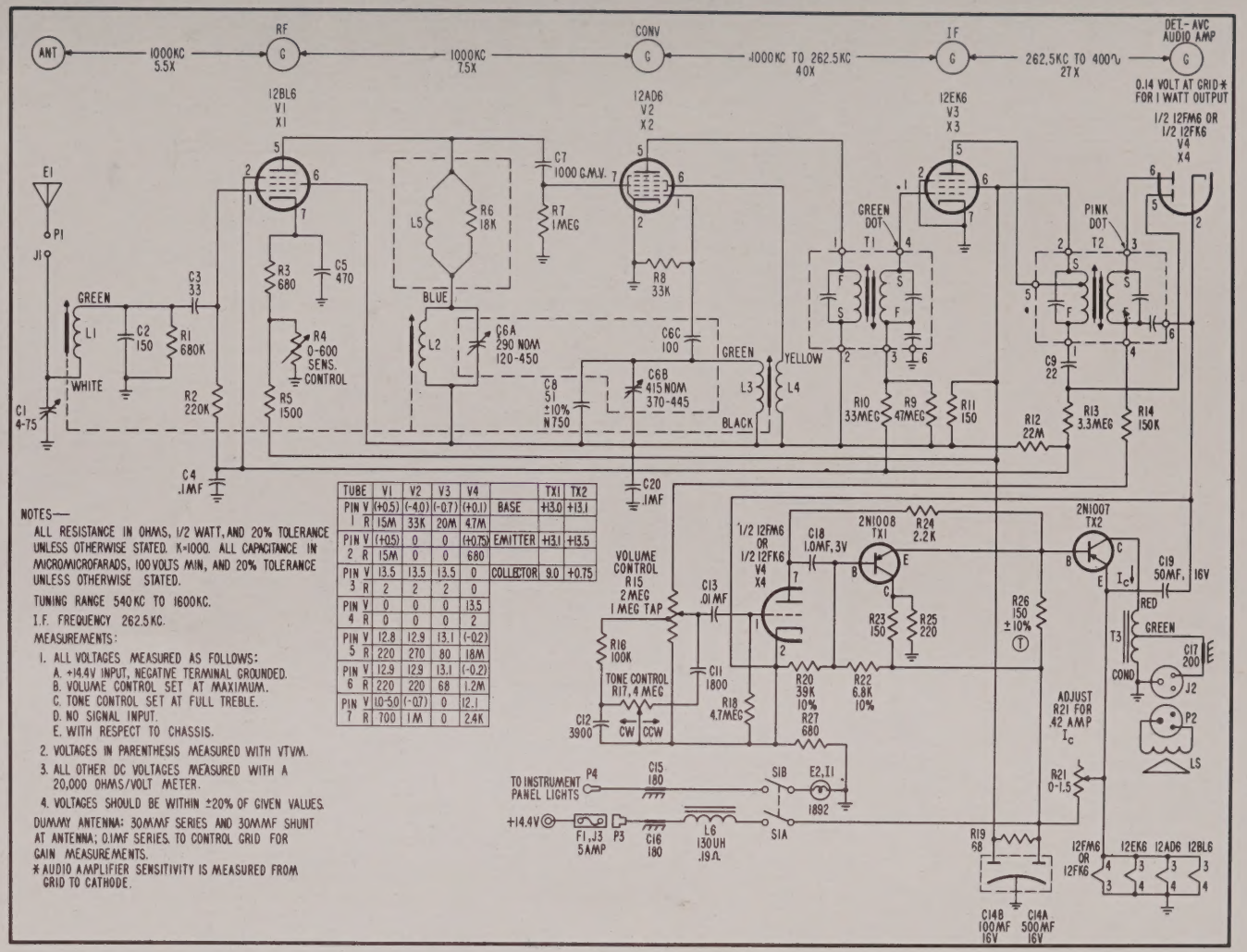
©Howard W. Sams & Co., Inc. 1959

Schematic Diagram Courtesy of DELCO RADIO DIV. GENERAL MOTORS CORP.

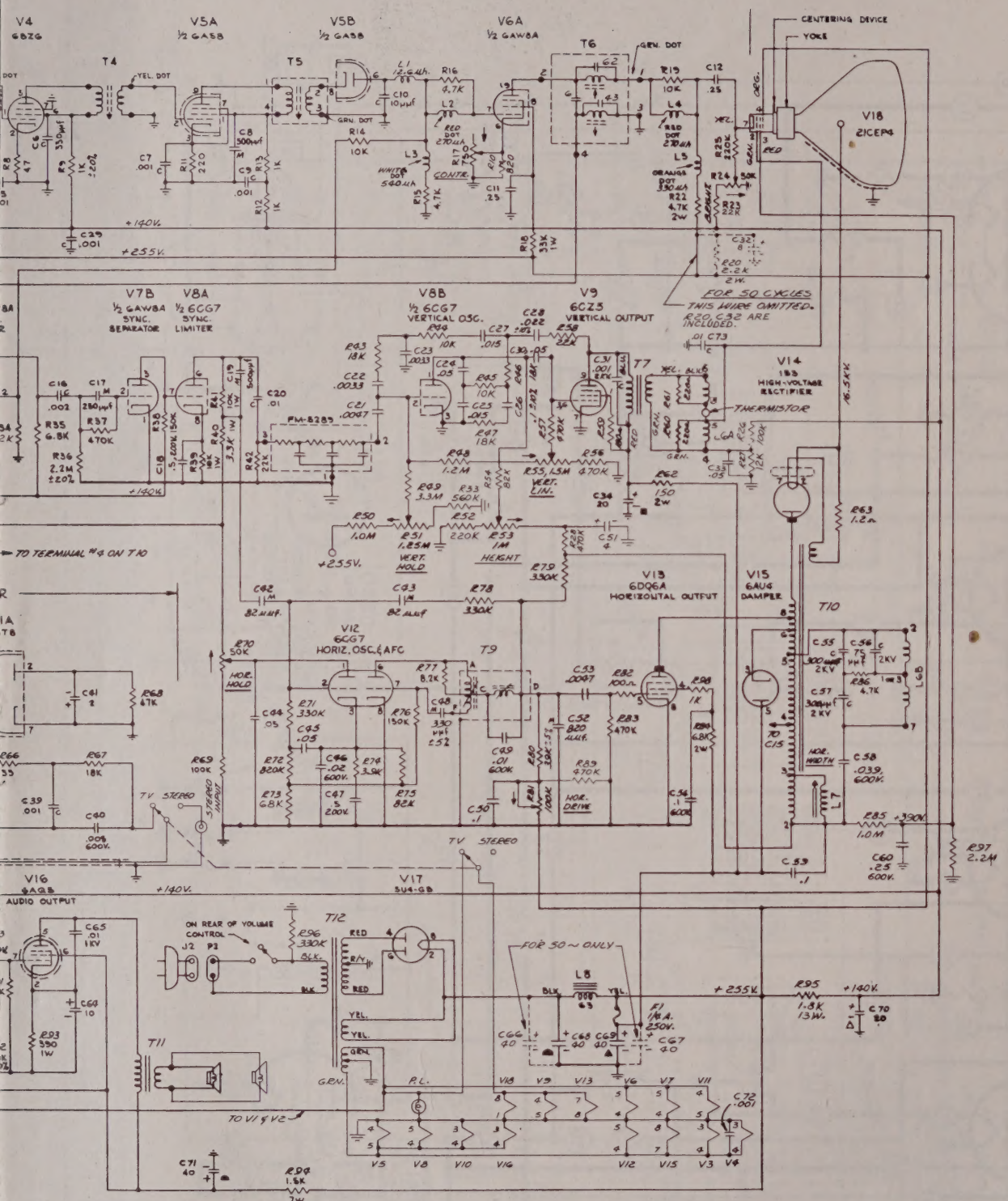



CADILLAC MODEL 7272505

# FORD MODEL 94BF (B9A-18805-A, B9AF-18806-D)




Schematic Diagram Courtesy of BENDIX RADIO DIV. BENDIX AVIATION CORP.




50 CYCLE MODELS.

1. POWER SUPPLY FILTER CONTAINS C66 & C67.
2. POWER XFMR. (T12) IS 50 CYCLE TYPE.
3. VIDEO AMPL. HAS ADDITIONAL R-C FILTER, AS SHOWN.

NOTES:

CAPACITOR SYMB.
C - CERAMIC
M - MICA

ARROWS ON CONTROLS INDICATE CW ROTATION.

UNMARKED ¢ NON-POLARIZED CAP. ARE PAPER, ±20%, 400V. EXCEPT AS NOTED.
RESISTORS 1/2W, ±10% EXCEPT AS NOTED.

| CHASSIS | RECEIVERS | SPEAKER |
|---|---|---|
| VR-121 | T-VR121 | (1) SL-4038 (9x6) |
| VR-121(50) | T-VR121(50) | |
| VR-121-1 | LB-VR121 | (2) SL-4037 (9x6) |
| VR-121-1(50) | LB-VR121(50) | |

Schematic Diagram Courtesy of ANDREA RADIO CORP.